# DEVELOPING EFL LEARNERS' ORAL SPEECH COMPETENCE THROUGH METACOGNITIVE STRATEGY INSTRUCTION SUPPORTED BY ARTIFICIAL INTELLIGENCE

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**Abstract:** The rapid development of artificial intelligence (AI) has created new opportunities for foreign language education, particularly in the development of learners' oral communication. However, access to AI-mediated interaction alone does not automatically guarantee the development of sustainable speaking competence. Learners also need to understand how they plan, monitor, evaluate, and regulate their own speaking performance. This article examines a methodological framework for developing English as a Foreign Language (EFL) learners' oral speech competence through the systematic teaching of metacognitive strategies supported by artificial intelligence. The theoretical foundation combines metacognition theory, language learning strategy research, communicative approaches to speaking, and recent research on AI-assisted language learning. The methodology of the article is based on a critical synthesis of established theoretical works, systematic reviews, meta-analyses, and empirical studies. Particular attention is given to planning, monitoring, evaluation, self-correction, goal setting, reflection, and strategy transfer. Recent research indicates a rapid expansion of AI-supported EFL research. A 2026 systematic review examined 708 publications from 2019–2024 and retained 103 studies, while a 2024 systematic review specifically examining AI chatbots for EFL speaking identified 24 empirical studies published between 2017 and 2023. A 2025 meta-analysis synthesized 23 experimental and quasi-experimental studies involving 1,872 participants and reported a statistically significant overall effect of AI-based interventions on EFL outcomes (Hedges' $g = 1.10$, 95% CI [0.76, 1.46], $p < .001$), although heterogeneity was high ($I^2 = 92.66\%$). These findings support the potential value of AI while simultaneously demonstrating the importance of pedagogical design. The article proposes a three-stage AI-supported metacognitive cycle—planning, monitored performance, and evaluation/regulation—as a practical methodology for EFL speaking instruction. The central argument is that AI should function as a scaffold for metacognitive development rather than as a substitute for teachers, human interaction, or learner cognitive activity.

**Keywords:** artificial intelligence, EFL, oral speech competence, speaking skills, metacognition, metacognitive strategies, AI-assisted language learning, ChatGPT, self-regulated learning, language pedagogy.

## Introduction

Oral communication is one of the most complex dimensions of second and foreign language competence. Unlike written production, speaking requires learners to formulate and express meaning in real time while simultaneously managing vocabulary, grammar, pronunciation, fluency, interaction, and communicative appropriateness. Luoma emphasizes that speaking involves rapid processing and production and that learners must coordinate several dimensions of language ability while communicating with another person [1, pp. 1–28]. The Common European Framework of Reference for


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Languages (CEFR) similarly treats oral competence as multidimensional, including oral production, oral interaction, planning, monitoring, repair, conversation, information exchange, and other forms of communicative activity [2, pp. 60–84].

For many EFL learners, especially those studying English in environments where opportunities for authentic English interaction are limited, speaking remains difficult despite extensive classroom instruction. Learners may possess considerable grammatical and lexical knowledge but experience difficulties retrieving language quickly, organizing ideas, maintaining fluency, responding spontaneously, or regulating anxiety during oral communication. Consequently, speaking instruction cannot be reduced to the transmission of linguistic knowledge. It must also develop learners' ability to manage their own cognitive and communicative processes.

Metacognition provides an important theoretical basis for addressing this problem. Flavell defined metacognition in terms of knowledge and monitoring concerning cognitive processes, including knowledge about persons, tasks, strategies, and the interaction among these elements [3, pp. 906–911]. In language education, metacognitive strategies commonly involve planning learning activities, monitoring performance, evaluating outcomes, identifying problems, and modifying strategies when necessary. Oxford's influential work on language learning strategies places metacognitive strategies within the broader category of indirect strategies concerned with the management and regulation of language learning [4, pp. 135–151].

The relationship between metacognition and second language learning has been examined empirically. Vandergrift, Goh, Mareschal, and Tafaghodtari developed and validated the Metacognitive Awareness Listening Questionnaire using data from 966 learners for exploratory factor analysis and a separate sample of 512 learners for confirmatory factor analysis. Their analysis identified five factors: problem-solving, planning and evaluation, mental translation, person knowledge, and directed attention [5, pp. 431–462]. Although the instrument was designed for listening, its underlying principles are relevant to speaking because oral communication also requires attention management, strategic decision-making, monitoring, and evaluation.

The emergence of generative AI has expanded the possibilities for implementing such metacognitive processes. AI-powered chatbots and conversational systems can provide learners with repeated opportunities for interaction, individualized prompts, immediate feedback, simulated communicative situations, and opportunities for reflection. Kohnke, Moorhouse, and Zou argue that ChatGPT can support language teaching and learning through activities such as generating language input, creating learning materials, facilitating interaction, and supporting feedback, while also requiring attention to accuracy, ethics, and learner digital competence [6, pp. 537–550].

Recent research provides increasingly substantial evidence concerning AI-supported EFL education. Tang and Zhang's 2026 systematic review examined 708 publications concerning AI technologies and AI-based tools in EFL learning from 2019 to 2024 and retained 103 studies for synthesis. Their review found that AI-based tools, particularly AI-powered chatbots, had been used to support integrated language skills, including speaking [7]. Du and Daniel's systematic review examined 24 empirical studies of AI-powered chatbots in English-speaking learning environments published between 2017 and 2023. Their synthesis identified reported benefits associated with speaking outcomes, pronunciation, confidence, engagement, motivation, and reductions in speaking anxiety [8].

At the same time, AI should not be regarded as an autonomous replacement for pedagogical decision-making. Hockly identifies both opportunities and risks associated with AI in English language teaching, including the need to consider reliability, pedagogical appropriateness, and the changing role of


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teachers [9, pp. 445–451]. Similarly, the U.S. Department of Education emphasizes that AI should be developed and implemented around human-centered educational principles, with attention to teacher involvement, transparency, safety, and learner agency [10, pp. 1–71].

The central problem addressed in this article is therefore methodological: **How can AI be integrated into EFL speaking instruction in such a way that learners do not merely interact with an AI system, but consciously plan, monitor, evaluate, and regulate their oral performance?**

The objective of the article is to develop an evidence-based methodology for teaching metacognitive strategies through AI-supported EFL speaking activities and to identify the pedagogical conditions under which such a methodology can contribute to oral speech competence.

**Methodology**

The article employs a theoretical and methodological research design based on critical analysis and synthesis of established literature. It does not claim to report a newly conducted classroom experiment. Consequently, no original participant sample, control group, pre-test/post-test scores, or invented statistical findings are presented.

The literature base consists of foundational works on metacognition and language learning strategies, methodological literature on speaking and assessment, official CEFR documentation, and recent systematic reviews, empirical research, and meta-analyses concerning AI in language education. Particular attention was given to studies that directly addressed AI-supported speaking, metacognitive scaffolding, ChatGPT-supported language learning, and systematic evidence concerning AI effectiveness.

The proposed methodology is constructed around three interconnected principles.

First, **metacognitive instruction must be explicit**. Learners should not simply be told to "use AI." They should be taught how to formulate goals, select strategies, monitor their performance, interpret feedback, and modify future performance. This follows the broader conceptualization of metacognition as conscious knowledge and regulation of cognitive activity [3, pp. 906–911].

Second, **speaking tasks should remain communicative**. AI activities should reproduce meaningful communicative purposes rather than consist exclusively of isolated grammar correction. The CEFR identifies oral production and interaction as complex activities involving planning, interaction, information exchange, discussion, and repair [2, pp. 61–84].

Third, **AI should operate as scaffolding rather than as an independent teacher**. The teacher remains responsible for task selection, learning objectives, feedback interpretation, ethical guidance, and assessment. This principle is particularly important because the available evidence shows both benefits and substantial variability in AI-supported language learning.

The proposed instructional cycle consists of three major phases.

**Planning phase**

Before speaking, learners establish a communicative goal and identify the linguistic and strategic resources necessary to achieve it. For example, the learner may receive the task: "Discuss the advantages and disadvantages of working remotely."

Instead of immediately beginning the conversation, the learner is asked to answer several metacognitive questions:

- What is my communicative objective?
- What vocabulary will probably be necessary?
- What grammatical structures will help me express my ideas?
- What difficulty am I likely to experience?
- How will I monitor my fluency?


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- What will I do if I cannot remember a word?
- How will I determine whether my response was successful?

AI can support this stage by generating topic-specific vocabulary, possible communicative situations, brainstorming prompts, or questions. However, learners should make the final decisions themselves. This distinction is essential because excessive dependence on AI can reduce the learner's opportunity to formulate and organize ideas independently.

The planning stage is consistent with the CEFR's recognition of planning as an important component of production strategies [2, pp. 68–70] and with research emphasizing planning and evaluation as components of metacognitive awareness [5, pp. 431–462].

**Monitored speaking phase**

During the second stage, learners perform a speaking task with AI acting as a conversational partner, interviewer, role-play participant, or feedback assistant. AI can generate questions, maintain a dialogue, simulate professional situations, and request clarification.

For example, an AI system can assume the role of a job interviewer while the learner responds as a candidate. The learner may then participate in a simulated interview involving questions about education, professional experience, strengths, weaknesses, and career objectives.

The critical methodological principle is that the learner should monitor performance during communication. The learner may use a monitoring checklist containing questions such as:

- Am I speaking continuously?
- Am I using the target vocabulary?
- Do I hesitate excessively?
- Am I communicating my intended meaning?
- Am I using appropriate grammatical structures?
- Do I need a compensation strategy?
- Am I responding directly to the interlocutor?

The learner can also use AI-generated feedback after completing a speaking segment. Importantly, the feedback should not simply be accepted as correct. Learners should evaluate it critically. This develops what may be described as **AI-mediated metacognitive monitoring**.

The relevance of this approach is supported by recent research specifically connecting AI, speaking, and metacognitive scaffolding. Lim and Chang investigated AI-powered EFL speaking education using metacognitive scaffolding and collected data from 103 students and 10 instructors. Their study found positive perceptions of AI's ability to provide prompt feedback and increase confidence, while also identifying concerns about excessive reliance on AI. Importantly, their analysis indicated that learners used AI more strongly for "awareness" than for "monitoring," suggesting a need for more structured scaffolding [11, pp. 181–210].

**Evaluation and regulation phase**

The third stage transforms AI interaction into deliberate learning. After completing a speaking activity, learners compare their performance with the original objective and identify strengths, weaknesses, and future actions.

The learner may ask:

- Did I achieve my communicative objective?
- Which linguistic problems occurred repeatedly?
- Which errors interfered with meaning?
- Which strategies helped me maintain communication?


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- Which feedback from AI was useful?
- Which feedback requires verification?
- What should I change in my next speaking task?

The final question is particularly important. Evaluation should lead to regulation. A learner who discovers repeated hesitation, for example, may decide to prepare lexical chunks before the next task. A learner who has difficulty maintaining interaction may practice follow-up questions. A learner who frequently abandons messages because of vocabulary gaps may practice circumlocution and paraphrasing.

Thus, the cycle becomes:

**Goal setting → Planning → AI-supported performance → Monitoring → Feedback → Evaluation → Strategy modification → New performance.**

This cyclical structure is more pedagogically meaningful than simple AI conversation because it explicitly develops learner autonomy.

**Results**

The literature synthesis identifies several important findings relevant to the proposed methodology.

First, AI-supported language education is now a substantial and rapidly expanding research field. Tang and Zhang's systematic review examined 708 publications from 2019 to 2024 and retained 103 studies. Their synthesis indicates that AI technologies and AI-based tools have been increasingly applied to EFL learning and that AI-powered chatbots are among the most frequently used tools [7].

Second, evidence specifically concerning speaking is developing but remains less extensive than the broader AI-in-language-learning literature. Du and Daniel reviewed 24 studies published between 2017 and 2023 concerning AI-powered chatbots in English-speaking learning environments. Their review characterized the research area as still developing while identifying reported benefits related to speaking performance, pronunciation, confidence, engagement, motivation, and speaking anxiety [8].

Third, quantitative evidence from broader EFL AI research suggests potentially substantial effects, but considerable heterogeneity. Ekizer's 2025 meta-analysis synthesized 23 experimental and quasi-experimental studies published from 2019 to 2025. The studies included 1,872 participants. The overall random-effects estimate was Hedges' $g = 1.10$, with a 95% confidence interval of approximately 0.76–1.46 and $p < .001$. However, heterogeneity was very high, with $I^2 = 92.66\%$, indicating substantial differences among studies, contexts, interventions, and outcome measures [12].

These statistics should not be interpreted as evidence that every AI intervention will produce a large effect. Rather, the high heterogeneity demonstrates that AI effectiveness depends strongly on implementation conditions. The same technology may produce different outcomes depending on learner proficiency, task design, instructional support, duration, assessment procedures, and teacher involvement.

Fourth, systematic evidence indicates that AI can provide learners with opportunities for repeated and individualized interaction. Labadze, Grigolia, and Machaidze reviewed 67 studies concerning AI chatbots in education and identified personalized learning, learning assistance, and skill development among the major reported benefits, while simultaneously identifying concerns related to reliability, accuracy, and ethics [13].

Fifth, metacognitive scaffolding appears particularly important because AI interaction by itself does not necessarily produce metacognitive development. The study by Lim and Chang is directly relevant to this issue. Their findings suggest that learners may use AI primarily to increase awareness rather than to engage systematically in monitoring and regulation [11, pp. 181–210].

This distinction is central to the proposed methodology. Awareness is necessary but insufficient. A learner may know that pronunciation is problematic without knowing how to improve it. A learner may


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recognize frequent hesitation without adopting a strategy to manage it. Metacognitive instruction therefore needs to transform awareness into monitoring, and monitoring into regulation.

**Analysis and Discussion**

The evidence suggests that AI can make an important contribution to EFL oral competence when it is integrated within a theoretically grounded pedagogical framework. The key issue is therefore not whether AI should be used, but **how learners are taught to use it**.

A purely technology-centered approach may produce frequent interaction but limited reflection. For example, a learner could spend thirty minutes chatting with an AI system without establishing a learning objective, monitoring performance, or evaluating feedback. Such activity may be engaging, but engagement alone cannot demonstrate the development of metacognitive competence.

A metacognitive approach changes the function of AI. Instead of being merely a conversational partner, AI becomes part of a structured learning cycle. Before speaking, AI can help generate possibilities while the learner formulates objectives. During speaking, AI can provide interaction and feedback. After speaking, AI can support reflection, but the learner remains responsible for evaluating and applying the feedback.

This approach also corresponds with broader developments in technology-enhanced language education. Kern argues that twenty-first-century technologies should be understood not merely as technical replacements for existing educational practices but as tools that transform relationships among learners, teachers, language, and communicative activity [14, pp. 515–533]. AI therefore needs to be integrated into language pedagogy rather than simply added to it.

The proposed methodology can be implemented through four major types of speaking tasks.

The first is **simulated interaction**. AI can act as a customer, employer, colleague, tourist, teacher, doctor, interviewer, or discussion partner. These activities can reduce the pressure associated with immediate interaction with human partners while providing repeated opportunities for practice.

The second is **problem-solving speaking**. Learners receive a communicative problem and must negotiate a solution. After the task, they identify which strategies were effective and which communication difficulties occurred.

The third is **presentation and monologue practice**. Learners prepare a short oral presentation, deliver it to an AI system, and analyze fluency, organization, vocabulary, pronunciation, and coherence. The CEFR's descriptors for sustained monologue provide a useful basis for designing such activities [2, pp. 62–65].

The fourth is **reflective dialogue**. Following a speaking task, AI can ask metacognitive questions rather than merely correcting language. For example: "What part of the conversation was most difficult for you?" "What strategy did you use when you could not remember a word?" and "What will you do differently next time?" Such prompts directly encourage metacognitive reflection.

Assessment should also be aligned with the methodology. Speaking competence should not be measured exclusively through grammar accuracy. A comprehensive assessment framework should consider fluency, lexical range, grammatical control, pronunciation/intelligibility, coherence, interaction, and achievement of communicative objectives. Luoma emphasizes that speaking assessment is complex because spoken performance is influenced by multiple dimensions and because oral interaction is inherently variable [1, pp. 59–95, 170–191].

A useful methodological distinction should also be made between **AI-generated feedback and validated assessment**. AI may identify potential grammatical, lexical, or pronunciation problems, but its output should not automatically be treated as authoritative. AI systems can produce inaccurate


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information, inconsistent judgments, or inappropriate recommendations. Consequently, teachers should establish procedures through which learners verify AI feedback against reliable linguistic resources, teacher explanations, rubrics, or established assessment criteria.

This issue becomes particularly important for metacognitive development. If learners accept every AI judgment without questioning it, they may develop technological dependence rather than metacognitive autonomy. The learner must therefore ask not only "What did the AI say?" but also "Is this feedback accurate, relevant, and applicable to my learning objective?"

Ethical and cognitive considerations are equally important. Kohnke, Moorhouse, and Zou emphasize that effective language-learning use of ChatGPT requires appropriate digital competencies [6, pp. 537–550]. The U.S. Department of Education likewise recommends human-centered approaches to AI in education [10, pp. 1–71]. Accordingly, learners should be taught about privacy, verification, responsible use, bias, and the limitations of AI-generated content.

The teacher's role consequently changes rather than disappears. The teacher becomes a designer of metacognitive learning environments, a moderator of AI interaction, a validator of feedback, and an assessor of communicative development. Teachers should determine when AI is useful and when direct human interaction is pedagogically superior.

The high heterogeneity identified in Ekizer's meta-analysis further reinforces this conclusion. An overall effect of Hedges' $g = 1.10$ accompanied by $I^2 = 92.66\%$ demonstrates that the effectiveness of AI interventions varies considerably across studies [12]. Therefore, it would be scientifically inappropriate to claim that AI universally improves speaking competence by a fixed amount. Instead, the evidence supports a conditional conclusion: AI has substantial potential, but outcomes depend on pedagogical design and contextual factors.

The methodology proposed in this article addresses this limitation by making metacognitive regulation a central instructional objective. The learner is not simply trained to speak with AI. The learner is trained to **learn how to improve speaking through deliberate use of AI**.

This distinction may be represented conceptually as:

**AI interaction → metacognitive awareness → monitoring → evaluation → strategic regulation → improved future performance.**

The model also supports learner autonomy. Over time, learners should require progressively less external scaffolding. At the beginning, the teacher may provide detailed monitoring checklists. At an intermediate stage, learners may select their own monitoring criteria. At an advanced stage, learners should be able to formulate personal speaking goals, independently evaluate AI feedback, and choose strategies without direct teacher intervention.

Such gradual reduction of scaffolding is consistent with the principle that technology should enhance learner agency rather than replace it. The ultimate pedagogical outcome is therefore not dependence on AI, but greater independence from external support.

**Conclusion**

The development of EFL oral speech competence requires more than increased exposure to English or increased access to conversational technologies. Learners need to understand and regulate the processes through which they plan, produce, monitor, evaluate, and improve spoken communication. Metacognitive strategy instruction provides an appropriate pedagogical mechanism for developing this capacity.

The evidence reviewed in this article demonstrates that AI-supported language learning has developed rapidly. Recent systematic reviews have documented a growing body of research on AI in


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EFL education, including an increasing number of studies focused on speaking and conversational interaction. Published quantitative evidence also indicates potentially substantial benefits, although high heterogeneity demonstrates that AI effectiveness varies considerably across contexts and methodological conditions.

The proposed methodology integrates AI with explicit metacognitive instruction through a cyclical process of planning, monitored speaking, evaluation, and strategic regulation. AI can provide conversational practice, individualized prompts, feedback, simulated communicative environments, and reflective questions. Nevertheless, the teacher remains essential for establishing objectives, selecting tasks, validating feedback, ensuring ethical use, and supporting learner autonomy.

The most important methodological principle is therefore that **AI should be used to strengthen metacognition, not to replace it**. The learner should remain cognitively active throughout the process: setting goals, choosing strategies, monitoring performance, questioning feedback, evaluating outcomes, and regulating future learning.

Future empirical research should test this methodology through controlled and longitudinal studies involving different proficiency levels and educational contexts. Such research should distinguish short-term improvements in fluency or confidence from sustained development of broader oral communicative competence. It should also investigate which combinations of AI tools, metacognitive prompts, teacher scaffolding, and communicative tasks produce the most reliable outcomes.

Ultimately, the pedagogical value of artificial intelligence in EFL speaking education will depend less on the technological sophistication of the AI system itself than on the quality of the instructional framework in which it is embedded. A carefully designed combination of AI-supported interaction and explicit metacognitive strategy instruction offers a promising direction for developing more autonomous, reflective, and communicatively competent EFL learners.

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