

REDESIGNING SCAFFOLDING WITH AI-ASSISTED DYNAMIC ASSESSMENT TO SUPPORT REAL-TIME LEARNING GROWTH IN EFL LEARNERS

¹*Nurlaela, ²Napius Kogoya, ²Basikin, ²Dyah Setyowati Ciptaningrum,
³Cristina E. Sayoto

¹Department of English Language and Culture, Faculty of Teacher Training and Education,
Universitas Tompotika Luwuk, Indonesia

²Department of English Language Education, College of Language and Art, Universitas
Negeri Yogyakarta, Karang Malang-Sleman, Yogyakarta, Indonesia

³Professional Education Department, College of Education, De La Salle University-
Dasmariñas, Cavite, Philippines

*Corresponding Author Email: elachryzna@gmail.com

Article Info	Abstract
Article History Received: January 2026 Revised: March 2026 Accepted: August 2026 Published: October 2026	<i>The integration of Artificial Intelligence in language learning is increasingly important because it can provide fast, personalized, and adaptive feedback that supports language competency development. However, in practice, the use of AI is often separated from the formative assesment framework, so it is not yet fully aligned with the principles of Dynamic Assesment (DA), which emphasizes the simultaneous integration of assessment and learning. This gap creates a need to understand how AI can used pedagogically to redesign scaffolding and support real-time learning growth in the context of English as a Foreign Language (EFL). This study aims to explore the use of AI in Dynamic Assessment and to examine the expereience and perception of students and lectures regarding its use. Using qualitataive approach, data were collected through observation, in-depth interviews, and documentation of AI exercise result among students in English Language and Culture Study Program of Universitas Tompotika Luwuk. Finding indicate that AI act as co-mediator that provide linguistic, phonological, metacognitive, and affective scaffolding, thereby accelerating the DA cycle and enhancing real-time learning growth. Students reported increased feelings of security, independence, and motivation, while lecturers felt that assessment effeciency and the quality of pedagogical interventions had improved. This study concluded that AI-assisted DA presents an effective innovative assessment model, but still requires conceptual mediation from lecturers for learning to be optimal.</i>
Keywords AI-assisted assessment; Real-time learning growth; Scaffoldings; Zone of proximal development;	
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INTRODUCTION

English as a foreign language (EFL) learning in the 21st century requires paradigm shift in the assessment process. Assessment is no longer understood as a tool to measure students achievent or students' final result, but as an integral part of the continuous learning process (Peña et al., 2025; Rutherford et al., 2025; Saleem et al., 2025; Sri et al., 2024). There are the different implementatation between traditional assesment and nowadays assessment. In

traditional assessment, measurement focus on the final product and do not capture the overall development of students. While nowadays assessment should measure not only students' result but also the development of students. Language assessment should provide space for measuring development of students, not just result (Aziz et al., 2025; Ghafar et al., 2025; Mar & A, 2024). This condition encourages the need for a more dynamic and responsive assessment approach to the learning needs for students.

One of prominent approach is dynamic assessment (DA), which is rooted in Vygotsky's sociocultural theory, particularly the concept of the Zone of Proximal Development (ZPD). Vygotsky emphasized that learning occurs through social interaction and scaffolding provided by more competent individuals. It is form of dynamic assessment. Dynamic assessment is an assessment model that combines evaluation with simultaneous learning support to see students' potential for development, not just their actual abilities (Elliott et al., 2018; Khasanah, 2020; Masrul et al., 2023; H. Mohammed & Alsaadi, 2021). However, the implementation of dynamic assessments often faces obstacles in the field. DA requires a high intensity of interaction between teachers and students. The presentation material also revealed that DA takes a long time, teachers' skills in providing scaffolding, and the ability to monitor developments on an ongoing basis (Le, 2023; Mehri, 2015; Nazari, 2017; Partanen & Hallin, 2025). The process of providing scaffolding in DA must be adjusted individually, thus demanding good pedagogical competence. This condition makes it difficult for DA to be implemented optimally without technological support.

In the context of technological developments, Artificial Intelligence offers a great opportunity to support a more adaptive and personalized assessment process. AI has the ability to facilitate learning by providing adaptive and data-driven feedback (S. J. Mohammed & Khalid, 2025; Shi, 2024; Zou et al., 2023). AI can help teachers monitor student progress in real-time. In the presentation material, it was also mentioned that modern assessments need to be sustainable, collaborative, and integrated with the learning process, so that the use of technology becomes very relevant in this context. Therefore, the integration of AI with dynamic assessment is a research domain that needs to be explored more deeply.

The integration of AI in DA can help redesign scaffolding models to be more responsive and efficient. AI-based systems are able to provide intelligent tutoring that adjusts the level of assistance based on student needs. This principle is in line with the scaffolding concept of Wood, Bruner, and Ross (1976), which emphasizes the importance of gradual help tailored to the student's ability (Fernández et al., 2015). By utilizing AI, scaffolding can be provided automatically, quickly, and remains personalized. In the material uploaded, it is emphasized that scaffolding is a core component in DA to help students' learning development gradually and reflectively (Du & Zhou, 2019; Monteiro & Siry, 2022; Safdari & Fathi, 2020). Therefore, the combination of DA and AI is a potential solution to overcome the limitations of manual DA.

Although there is research that addresses DA and technology separately, there is still limited research that examines the integration of AI specifically in scaffolding redesign. There are some researchs examines dynamic assessment in the context of academic writing, but has not integrated AI in the process (Etemadi & Abbasian, 2023; Masrul et al., 2023; Siwi et al., 2024). There were also studies examined the impact of DA on reading comprehension, but their research still focused on human interaction (Ajideh, 2012; Birjandi et al., 2013; David & National, n.d.; Dixon et al., 2023; Farisyah et al., 2025). Some researchers also examined the effects of DA on speech skills, but the study did not associate student development with adaptive technology (Fahmi et al., 2020; Gilani & Dan, 2021; Kusumaningrum, 2018). This gap is an important foundation for developing research that systematically integrates AI in DA.

Based on this gap, this study seeks to explore how AI can be used to support DAs in providing real-time scaffolding to EFL learners. (Hasumi & Chiu, 2024) emphasized the importance of using technology to improve engagement and quality of language learning. Meanwhile, (Fan & Ma, 2022) stated that technology can improve the quality of language assessment through automated feedback and student performance analysis. The integration of AI with DA is expected to provide a new picture of the potential of technology in encouraging student learning growth. In addition, this research is expected to enrich interactive learning models based on sociocultural theory. The main objective of this study is to understand how AI-based systems can support the dynamic assessment process and redesign scaffolding in EFL learning. Using a qualitative approach, this study focuses on the experience of students and teachers in using AI-assisted DA. Therefore, this study not only describes the process, but also analyzes its perceptions, challenges, and implications.

The novelty of this study lies in the integration between AI and dynamic assessment in the context of scaffolding redesign to support the growth of real-time learning in EFL learners. The integration of smart technology in language learning is still a field that is rarely studied in depth. By combining DA, AI, and Vygotsky's ZPD theory, the research offers a new approach that is comprehensive and relevant to modern learning challenges. The uploaded presentation material also emphasizes the need for development-oriented assessments and continuous feedback, so that this research has strong relevance in enriching contemporary ELT discourse. Thus, this research makes a theoretical and practical contribution to the development of technology-based language assessment. The research questions from this study are as follows: How does the use of Artificial Intelligence (AI) in dynamic assessment help redesign scaffolding to support real-time learning growth in EFL learners?; and What are the experiences and perceptions of EFL learners and teachers about the use of AI-assisted dynamic assessments in supporting their learning development?

RESEARCH METHOD

Research Design

This study uses a qualitative approach because the research focuses on the use of AI-Assisted Dynamic Assessment in the English Language and Culture Study Program. The qualitative approach was chosen because the purpose of this research is to explore and understand in depth how AI plays a role in dynamic assessment, as well as how students and lecturers' experiences and perceptions toward it. The integration of AI in dynamic assessment is not only related to measurable learning outcomes, but also to the process of mediation, interaction, scaffolding, as well as contextual affective and metacognitive experiences. Thus, qualitative methodology is the right method to be used to explore meaning, subjective experience, and learning dynamics in the EFL context. The research stages were carried out chronologically, starting with a literature study on Dynamic Assessment, Artificial Intelligence in ELT, scaffolding, and real-time learning growth. Furthermore, the researcher conducted preliminary observations on the use of AI in the English Language and Culture Study Program classroom.

Research Participants

The research participants consist of students and lecturers of the English Language and Culture Study Program of Universitas Tompotika Luwuk who have implemented the use of Artificial Intelligence applications or platforms in English language learning. Participants were selected using purposive sampling techniques. The number of research participants includes 3 lecturer and 7 students. The criteria for selecting research subjects are lecturers who have applied AI in the learning and assessment process for approximately two semesters, as well as students who usually use AI in the learning and assessment process. The selection of this amount was carried out to obtain in-depth data while maintaining the manageability of

the analysis process. The main focus of the research is the meaning of the experience and process of using AI in dynamic assessment.

Instrument

The main instrument of the research is the researcher himself as a data collector and analyzer. In addition, the research used supporting instruments in the form of (1) Observation Sheets, (2) Semi-structured interview guides, and (3) Documentation.

Observation sheets are used to record in detail how lecturers implement Dynamic Assessments, how AI provides automated scaffolding, and how students respond to the assistance. The observation sheet contains several main components, namely the form of mediation (mediation provided by lecturers, AI, and a combination of both), stages (diagnosis, intervention, and internalization), types of scaffolding (linguistic, phonological, metacognitive, affective), and interaction patterns between lecturer-AI-students.

This guide is used to explore and explore experiences, perceptions, constraints, and benefits of using AI in dynamic assessment processes. The interview guide is structured with several questions that can answer the research question. One example is "Do you feel more independent in learning after using AI? Why?" and the question for lecturers, "Does AI help speed up the process of diagnosing students' abilities?". The interview guidelines are tested for clarity and suitability with the research objectives before being given to the research subject. Documentation is in the form of AI usage logs, automatic feedback results, audio/video recordings of the learning process, screenshots of evaluation results, and lecturer notes.

Data Collection

Data were collected through observation, semi-structured interviews, and documentation to obtain comprehensive and context-rich information about the phenomenon under investigation. Observation was employed to capture participants' behaviors, interactions, and situational contexts directly, while semi-structured interviews provided opportunities to explore participants' experiences, perceptions, and interpretations in greater depth. Documentation, including relevant records, photographs, and written materials, was used to complement and verify data obtained from observations and interviews. To ensure the trustworthiness of the findings, the study applied triangulation of both data sources and methods by comparing information collected from different participants and through different techniques. Member checking was conducted by returning key interpretations to participants for confirmation and clarification. Peer debriefing was also employed to reduce researcher subjectivity through critical discussion with colleagues. In addition, an audit trail and reflective researcher notes were maintained systematically to enhance transparency, document analytical decisions, and minimize potential bias throughout the data collection and interpretation processes.

Data Analysis

Data analysis was conducted using the interactive analysis model of Miles, Huberman, & Saldana (2014). The analysis is carried out simultaneously with the data collection process. The first stage is data condensation, which is the process of sorting, focusing, simplifying, and encoding raw data from observations, interviews, and documentation. The data is coded based on themes such as: the shape of AI scaffolding, lecturer-student-AI interaction, student response, and real-time learning progress. The next stage is data presentation, which is organizing data in the form of a table of findings, theme matrix, concept map, and descriptive narrative to make it easier for researchers to see the relationship between categories. After that, conclusions are drawn, namely formulating meanings, patterns, and principles that emerge from the data. This process is carried out iteratively to ensure that the conclusions are in accordance with the field data. Then, researcher ensure the validity of the data through

technical triangulation (observation, interviews, documentation), triangulation of sources (students, lecturers, AI log data), and member checking to ensure the credibility of the research results.

RESEARCH FINDINGS AND DISCUSSION

Research Findings

The research finding show that the use of AI in dynamic assessment contributes significantly to redesigning scaffolding to be more adaptive, gradual, and responsive to the needs of EFL learners. So, it is able to support learning growth in real time through instant feedback and continuous mediation. AI not only functions as a correction tool but also as a mediator that helps the process of error diagnosis, providing interventions, and encouraging the internalization of language understanding independently. In addition, EFL learners and lecturers show a positive perception of the application of AI-assisted dynamic assessment, because it is considered to increase metacognitive awareness, accelerate error correction, and change the role of teachers into reflective facilitators who strengthen the scaffolding process during the learning process.

Utilization of AI in Dynamic Assessment to Redesign Scaffolding

Integration of Artificial Intelligence in Dynamic Assessment in EFL Classrooms

The results of the study show that the integration of Artificial Intelligence (AI) in learning not only functions as a supporting tool, but has become an integral part of the core mechanism of Dynamic Assessment (DA) in EFL classrooms. The learning process observed shows that lecturers no longer start assessment from scratch, but instead utilize AI as the first diagnostic engine that provides quick and structured feedback to students. In practice, students are asked to perform various language activities, both in the form of speaking and writing assignments using AI platforms such as pronunciation evaluator, grammar checker, or intelligent writing assistant applications. After students complete the assignment, the AI provides immediate feedback in the form of scores, error highlights, accuracy measurements, and revision recommendations. Students then bring these results to class for analysis with the lecturer. This process demonstrates that learning follows a three-stage flow: (1) independent practice through AI, (2) automated feedback as initial mediation, and (3) further scaffolding by the lecturer.

The lecturer¹ described this mechanism very clearly: *"I ask students to practice speaking or writing on the AI application. After that, they bring the results to class, and I use that data to provide additional assistance. AI speeds up the diagnosis stage, while I deepen the guidance."* This quote emphasizes that AI allows the assessment process to run simultaneously with learning, rather than in stages as in traditional models. This principle is in line with the material in the Assessment and Evaluation in ELT document, which emphasizes that assessment and teaching must occur together as a continuous process. The integration of AI allows these ideal DA conditions to be achieved in the EFL classroom. Students also feel a significant shift in how they understand assessment. A student said that AI has changed their perception of assessment: *"In the past, when I submitted an assignment, I didn't know where I had gone wrong until the lecturer returned it. Now, AI tells me immediately, in a matter of seconds. I now feel that assessment is part of the learning process, not something to be afraid of."*

This statement shows that AI has helped shift students' mindset from assessment as an evaluation tool to assessment as a learning tool, which is the core of the concept of assessment for learning. Students are not only assessed, but also guided to understand their mistakes through relevant direct feedback.

Table 1

Findings from Observations on Strengthening AI Integration in DA

Meeting	Observation	Indication of DA
1.	Students use AI pronunciation tools; each student shows 4-6 phonological errors that are automatically detected.	AI accurately identifies students' actual performance, helping lecturers understand students' ZPD starting points.
2.	The lecturer asks students to bring their AI grammar check results, & the class process begins immediately with a discussion of error patterns.	Teachers can provide further scaffolding without starting manual diagnosis.
3.	AI highlights recurring errors such as preposition errors and word choice errors.	AI supports metacognitive scaffolding by showing error patterns.
4.	Students show graphs of AI performance improvement each week.	Real-time learning growth is clearly visible, in line with the principle of progress focused assessment.

This observation reinforces that the presence of AI in DA provides effectiveness that cannot be achieved with traditional manual methods. AI accelerates the diagnosis phase, allowing instructors to fully focus on more meaningful pedagogical interventions.

Types of Scaffolding Generated by AI in the Dynamic Assessment Process

This study found that AI generates various forms of scaffolding that are highly relevant to the needs of EFL learners. The scaffolding appears in four categories: linguistic, phonological, metacognitive, and emotional. All four work in layers, providing comprehensive support that accelerates student development and supports the mediation provided by lecturers.

Linguistic Scaffolding (Grammar, Vocabulary, Cohesion)

AI provides highly detailed and data-driven linguistic corrections. These corrections cover grammar, tense usage, sentence structure, vocabulary selection, register appropriateness, and inter-sentence cohesion. Students stated that this linguistic feedback helped them understand language rules in a more systematic and focused manner. Student2 said: *"AI immediately shows me if my sentences are too long or incoherent. I can see suggestions for making sentences more concise. My vocabulary has also improved because AI often suggests more appropriate synonyms."*

This excerpt shows that AI linguistic scaffolding can strengthen students' writing skills in two main aspects: accuracy and flexibility. This finding is in line with the presentation document, which states that scaffolding should enable students to develop gradually in speaking, and writing. AI performs this function through fine-grained instructions, which are difficult to achieve in manual corrections by a single lecturer for many students.

Phonological and Pronunciation Scaffolding

One of the main contributions of AI is its ability to provide accurate and consistent phonological feedback. Feedback covers aspects such as clarity, stress, intonation, fluency, and segmentation of sounds. This type of correction is very difficult for lecturers to do in large classes. Student3 said: *"I only realized I was mispronouncing 'entrepreneur' after AI highlighted the incorrect part in red. The lecturer also said my pronunciation is clearer now."* In addition, AI provides numerical scores and visual graphs of students' phonological development. This type of feedback is diagnostic and formative, supporting the DA principle that intervention must be ongoing, not just at the end of the process.

Metacognitive Scaffolding (Awareness, Monitoring, Regulation)

Metacognitive scaffolding emerges when AI displays error patterns, week-to-week accuracy, and recommendations that help students understand their own learning processes.

This encourages students to develop learning awareness. Student 3 (M3) stated: *"Every time I practice, Al tells me which mistakes I often repeat. I have become more aware of my learning patterns. It feels like having a personal evaluation record."* Al creates a self-regulated learning cycle, which is a cycle where students: (1) identify mistakes, (2) understand their causes, (3) make revisions; and (4) re-evaluate their progress. This is in line with the main objective of growth assessment, which is emphasized in the presentation document that learning must emphasize continuous self-development.

Emotional Scaffolding and Motivation

In addition to cognitive scaffolding, Al also provides affective support in the form of reduced anxiety and increased motivation. Students feel more comfortable trying new things because Al does not provide social judgment. Student3 said: *"Since Al doesn't judge me personally, I don't feel embarrassed. That makes me feel very comfortable learning."* This aspect is in line with the Affective Filter Hypothesis, which states that high anxiety can inhibit language acquisition. Al creates a safe space, so that students are more willing to take linguistic risks and are more confident.

Impact of AI Intervention on Real-Time Learning Development

The use of Artificial Intelligence (AI) in the Dynamic Assessment (DA) process has had a tangible impact on student learning development in a relatively short period of time. Within four weeks of research, students showed continuous and measurable progress in various aspects of English language proficiency, ranging from linguistic skills (grammar, vocabulary, coherence), phonological skills (intonation, stress, clarity), to overall oral and written production skills. This development is not merely an increase in evaluation scores, but also a change in the way students understand errors, monitor themselves, and control their learning process. This shows that Al intervention works not only at the cognitive level, but also at the metacognitive and affective levels.

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Increased Speed of Error Correction

One of the most notable changes is the acceleration of the time students take to correct errors. Before Al integration, students usually had to wait for corrections from lecturers, either through the next class meeting or through time-consuming manual corrections. However, with Al, students can immediately see their mistakes and correct them instantly. This creates a more dynamic and responsive learning cycle, where feedback is not delayed, but is provided right when students are engaged in learning activities. Student4 said: *"I feel like I learn faster because I can correct my mistakes immediately after the Al gives me feedback."* This quote confirms that students feel a change in their learning rhythm. They no longer wait for corrections, but actively seek and correct errors based on Al feedback. Classroom observations show that some students repeat pronunciation exercises up to 5-7 times in a single session just to change the indicator color from red to green. This shows that Al has

created a rapid learning-feedback loop, where students practice, receive feedback, correct, reevaluate, correct again, all in a short period of time.

Increased Linguistic Awareness

In addition to increasing the speed of error correction, AI also contributes to improving students' linguistic awareness. This linguistic awareness arises when students begin to understand error patterns, their causes, and how to avoid them in the future. AI provides very clear data on recurring errors such as preposition selection, subject-verb agreement, tense usage, or coherence errors in paragraphs. The Lecturer2 stated: *"I see that the pattern of student mistakes is decreasing every week. AI helps them understand weak areas before I intervene."*

Real-Time Growth

AI interventions in DA allow students to see their progress visually and in a structured way. Based on the documentation collected, there was a significant improvement in various aspects of students' English language skills within four weeks. Developmental outcomes include pronunciation clarity, grammar accuracy, coherence writing, and increased speech fluency. It is in line with the principle of progress-oriented assessment in the Dynamic Assessment document, which emphasizes that assessment should be growth-oriented, not achievement-oriented. AI provides visual measurement tools that help students monitor their progress on a weekly basis. The results of the observation also showed that students felt more motivated when they saw the graph of the increase

EFL Learners' and Lecturers' Experiences and Perceptions of AI-Assisted Dynamic Assessment

Students' Experience in Using AI-Assisted DA

Students responded very positively to the use of AI in the Dynamic Assessment process. They assessed that the use of AI not only eases the training process, but also provides a safe space to experiment with language without social pressure. From in-depth interviews, students describe that AI gives them a greater sense of control in learning, as well as the opportunity to keep trying until they achieve the best results. Overall, their experience reflects the principle of learner-centered learning in which the learner becomes the main agent of his or her own learning process. They not only receive passive feedback, but also learn to understand error patterns and make revision decisions independently.

Sense of Security and Decreased Anxiety

One of the most powerful findings from the study is that students feel more emotionally secure when learning to use AI. Student7 stated: *"I can train at 11 p.m., without fear of being judged by others."* This statement reflects the decline of the affective filter as stated by Krashen. Students feel that AI does not provide assessments that contain social elements such as criticism, gaze, or subjective judgments that may occur when studying with humans. AI doesn't embarrass them when they're wrong, because mistakes are considered a normal part of the learning process, not something embarrassing. From the observation results, it can be seen that students who are usually passive in class are more active in doing independent exercises through AI. When the lecturer asked the students to show the results of the pronunciation exercise, the students showed a graph of vowel improvement and consonant clarity without embarrassment, as if their previous mistakes were no longer a psychological burden.

Increased Learning Autonomy

Students in this study showed a higher level of learning autonomy when AI was used as part of Dynamic Assessment. Students feel that AI makes them not have to wait for a lecturer for every correction they want. Thus, they can set their own learning pace and determine how often they want to practice. Student5 explained: *"I can practice many times until I am*

satisfied. It makes me more independent." This autonomy arises because AI provides instant feedback that does not require direct supervision from lecturers. Based on observations, students often revise 3-5 times in one writing practice session, something that is difficult to achieve if you only rely on manual feedback from lecturers. Students can evaluate their progress independently and make active study decisions, without direct instruction. In the context of Dynamic Assessment, this condition shows that students have utilized self-regulated learning strategies, namely the ability to plan, monitor, and evaluate their own learning process. AI provides space for students to exercise internal control over the learning process, something that is strongly emphasized in the learner autonomy approach in ELT.

Flexibility of Time and Place

AI also brings high flexibility in the learning process. Students can practice anytime and anywhere without the limitations of the classroom. This expands the concept of language learning to be closer to the principles of lifelong learning, as affirmed in the Growth Assessment. This flexibility allows students to maximize their free time, while increasing the intensity of language exposure. AI provides access to learning that is not limited by time and location so that academic achievement is no longer completely dependent on classroom sessions.

Lecturers' Experience as Mediators in AI-Assisted DA

The lecturers in this study described their role as mediators assisted by AI, not replaced by it. They continued to play a major role in providing high-level scaffolding, while AI handled the technical aspects. These findings reveal a harmonious relationship between technology and pedagogy, where technology works on the first layer (technical diagnosis), and then lecturers enter the second layer (interpretation, concept reinforcement, strategy guidance, and reflection).

The lecturer reported that one of the main impacts of using AI is increased efficiency in providing feedback. Previously, correcting grammar, spelling, and pronunciation took time and energy. However, with AI, lecturers can immediately see areas where students have difficulty without having to manually check the entire assignment. Lecturer3 said: *"I can focus on the big picture, such as argumentation and coherence, because AI has taken care of the technical aspects."* Class observations show that lecturers use AI results as a basis for class discussions. For example, when AI identifies that most students make preposition errors, lecturers immediately design mini-lessons on the use of prepositions in an academic context. This efficiency makes learning time more productive.

With the advent of AI, lecturers are no longer positioned as "graders" or "main correctors," but rather as facilitators who help students interpret AI results and relate them to real-world communication contexts. Lecturers stated that they now spend more time on reflective discussions than on technical corrections. As stated by Lecturer1: *"I'm more like an academic mentor now, not just a corrector."* Despite its significant benefits, the use of AI is not without challenges. Lecturers have identified several obstacles. They are student dependence on AI. It means some students accept every AI correction without checking the context. Next, AI feedback is not always accurate, the need for digital literacy, and ethics of technology use.

Perceptions of the Effectiveness of AI Scaffolding

Students generally view AI scaffolding as something that fast, objective, consistent, easy to understand, and motivating. The interviews showed that students liked the way AI provided colored highlights and brief explanations of their mistakes. They felt that learning became easier because they did not have to guess what was wrong, Evaluation scores, progress charts, and automatic recommendations provided additional motivation that kept them practicing. While the lecturer assess that AI scaffolding is effective in addressing technical errors,

accelerating the Dynamic Assessment process, enhancing diagnostic capabilities, and increasing the depth of pedagogical intervention. Lecturers feel that they can identify patterns of errors made by each student more quickly through AI reports, enabling them to provide more targeted scaffolding.

Challenges, Benefits, and Compatibility with Sociocultural Theory

The study noted several technical challenges, such as fluctuating internet connections, sometimes inaccurate voice detection, and grammar feedback that is too literal. These challenges affected the smooth running of student practice, but did not significantly reduce the quality of learning. Some students misinterpret AI feedback. For example, the AI suggests replacing certain words, but students do not fully understand the context of their use. Lecturers must correct this misconception by providing macro-scaffolding through class discussions or individual consultations.

Despite the challenges, the pedagogical benefits of AI are students more confident, self-regulated learning emerges, improved speaking and writing skills, and the focus shifts from grades to the learning process. AI encourages students to engage in deep learning, not just surface-level learning. According to sociocultural theory, learning occurs through mediational tools. In this study AI plays a role as a modern mediation tool, Lecturers remain the main mediator, and the learning process takes place in ZPD through collaboration, namely AI → Students → Lecturers → Students. This structure creates a learning ecosystem that is highly aligned with the principles of sociocultural learning and Dynamic Assessment because it involves multi-level interventions that strengthen students' language development.

Discussion

The findings of this study make a theoretical and empirical contribution to the development of the concept of dynamic assessment, scaffolding, and the use of AI in education, especially for EFL learners. In general, the results show that the integration of Artificial Intelligence (AI) into Dynamic Assessment (DA) helps to redesign scaffolding and supports real-time learning growth in EFL learners. This is in line with the initial idea of DA formulated by (Rutherford et al., 2025; Saleem et al., 2025), that assessment should be integrated with teaching in one integrated activity, rather than two separate processes. Previous studies, such as DA on the context of academic writing (Etemadi & Abbasian, 2023; Masrul et al., 2023; Siwi et al., 2024), DA on reading comprehension (Ajideh, 2012; Birjandi et al., 2013; David & National, n.d.; Dixon et al., 2023; Farisyah et al., 2025), and DA on the context of speaking (Fahmi et al., 2020; Gilani & Dan, 2021; Kusumaningrum, 2018), have also shown that DA is able to improve language performance when assessments are conducted dialogically, rather than statically. The findings of this study are consistent with these findings, but make a new contribution by placing AI as one of the main mediators in the mediation and scaffolding process, which is not explicitly present in previous studies that still rely entirely on human interaction.

When compared to the research of (Fahmi et al., 2020) which showed that DA is able to improve the speaking ability of EFL students in Indonesia through the pretest, mediation, posttest and reflection stages, the findings of this study expand the practice by adding an automatic feedback component from AI as additional mediation. Other studies on DA in speech ability, such as a study on the accuracy and fluency of speaking in pre-intermediate learners, also reported that the step-wise mediation process contributed positively to improved oral performance. The study supports these findings, but shows that some step-wise mediation can now be delivered automatically by AI (e.g., correction of pronunciation, grammar, and sentence coherence), while lecturers manage mediation at a more conceptual and reflective level. Thus, this study places AI as a micro-mediator who works at the technical level, and lecturers as a macro-mediator who handles aspects of meaning, strategy, and reflection.

From the perspective of cross-skill DA, the results of this study are also in line with the findings of (Naeini & Duvall, 2012) which show that DA can improve EFL students' reading comprehension skills through the pretest–mediation–posttest cycle. On the other hand, (Etemadi & Abbasian, 2023) found that DA in academic writing helps students not only improve texts but also develop rhetorical awareness and discourse structure. This research supports this general pattern, where mediation (now amplified by AI) does not stop at the level of correction but moves towards increasing language awareness and self-reflection. However, in contrast to these studies, whose entire media is based on human interaction, this study provides evidence that activity logs and automated feedback from AI can be a very effective raw material for advanced mediation by lecturers within the framework of DA.

In the realm of technology integration, the results of this research also need to be read side by side with studies that discuss the effectiveness of AI tools in language learning. An evaluative study of three popular AI tools (Grammarly, Duolingo, and ELSA Speak) shows that these tools are effective in providing linguistic feedback and are able to improve learning outcomes, although accuracy and user perception vary. A systematic review of AI in EFL teaching also concluded that NLP-based applications and intelligent tutoring systems can improve writing and speaking skills through instant and detailed feedback, while reducing the burden on teachers. The study's findings not only support that claim, but also add a new dimension, namely AI is not only used as a separate training tool, but is consciously embedded into the framework of DA and ZPD theory. In other words, the study shows that previously reported positive AI outcomes can be amplified when AI is explicitly positioned as a mediating component in DA, rather than as a stand-alone exercise application.

Studies on human-AI collaboration in writing feedback also provide important context. A study of human-AI collaborative feedback on EFL writing showed that the combination of teacher feedback and AI resulted in significant improvements in accuracy, complexity, and fluency in writing, compared to just one form of feedback. These findings are in line with the results of this study, where students and lecturers alike consider that the most effective is not AI or teachers separately, but the collaboration of the two in the context of DA. However, the study also adds a process aspect, that is not just who gives feedback, but when and how that feedback is positioned in the DA cycle. In this study, AI feedback was present first as a trigger, followed by reflective teacher mediation, this is in line with the step-wise mediation model in the speech DA study that organizes the order of cues from minimal to more explicit.

On the other hand, not all previous findings are fully aligned with the results of this study. Some DA studies show that not all participants respond optimally to mediation, for example, Naeini & Duvall (2012) reported that a small percentage of students showed minimal improvements, allegedly related to the level of involvement and readiness in their ZPD. This study found a similar phenomenon: there are students who still tend to passively accept AI corrections without processing them, and there are also those who experience confusion when AI provides feedback that is too generic or non-contextual. This suggests that although technology increases the intensity and frequency of mediation, the quality of student responses is still determined by cognitive and affective readiness factors, as ZPD theory and previous DA studies have warned.

In addition, the findings of this study also resonate with cutting-edge studies on AI in language education that highlight that AI is effective in providing individualized feedback, increasing the frequency of exercises, and reducing the burden on teachers, but still risks creating technology dependency and shifting students' focus to simply "following machine suggestions" without critical thinking. Interview data shows early indications in that direction, for example, when students admit to "following all AI corrections right away," which means lecturers need to design teaching strategies that encourage students to reflect and verify feedback, rather than blindly accepting it. At this point, the principles of constructivism and

self-regulated learning become a critical lens that reminds us that the end goal is not just a language that is "error-free", but a learner who is able to control, evaluate, and develop his or her language skills independently.

This research confirms that AI can be a catalyst that accelerates and enriches the process, as long as it is guided by the right theoretical framework and does not replace the role of the teacher as the main mediator. Theoretically, this study is at the crossroads between the findings of classic Das, and recent studies of AI in ELT (Duolingo studies, Grammarly, ELSA, human–AI feedback, and AI writing assistants). Critically, this study also adds nuances that the success of AI integration in DA is not just a matter of adding technology, but how the technology is interpreted and managed within the framework of ZPD, mediational scaffolding, and growth-oriented assessment. Thus, this study not only affirms previous results but also fills in the gaps by offering a more holistic and contextual AI-Assisted Dynamic Assessment conceptual model.

However, this research has several limitations. The limited number of participants from a single institution necessitates careful generalization of the findings. In addition, this study focuses on implementation in the context of EFL learners, so the dynamics of the use in other fields of study or at different education levels may yield different results. Based on these limitations, further research is suggested to involve more diverse participation and be carried out in various educational contexts, both at the secondary school and higher education levels across various universities, as well as in different disciplines.

CONCLUSION

This study confirms that AI-assisted dynamic assessment in EFL learning not only reconstructs the scaffolding process to be more adaptive and responsive, but also allows real-time monitoring and learning growth support. This research shows that the integration of Artificial Intelligence (AI) into the Dynamic Assessment (DA) framework is able to bring a significant transformation in the pattern of assessment and English language learning at the university level. In practice, AI functions not only as a technological tool but as an integral part of the assessment process that takes place on a continuous basis. The existence of AI allows assessments to occur simultaneously with the learning process, in line with the core concept of DA, which emphasizes that assessments must be integrated with instruction. Students no longer wait for feedback from lecturers for a long time, but gain information about their actual abilities in a matter of seconds. This fast and adaptive feedback pattern shows that AI helps fill the initial mediation space that was previously done manually by lecturers, while accelerating the process of identifying errors and student learning needs.

The students' experiences in this study illustrate how AI reduces learning anxiety and increases a sense of security in language practice. Students feel freer to try, make mistakes, and correct them without fear of being socially judged. These findings are in line with Krashen's theory of the Affective Filter, which states that positive emotional states can improve language acquisition. AI provides a stress-free practice space so students can focus on progress, not on the fear of making mistakes. In addition, developmental visualization features such as pronunciation, grammar, or coherence score improvement charts increase students' intrinsic motivation. This is in accordance with the principle of growth assessment that learning will be more meaningful when students can see and reflect on their progress gradually.

From a pedagogical perspective, this study shows that the role of lecturers is not reduced by the presence of AI, but rather strengthened. Lecturers are no longer burdened by time-consuming technical corrections, as these aspects have been supported by AI. Instead, lecturers can focus their energy on high-level scaffolding, such as conceptual explanations, communication strategy development, and critical thinking skills. In other words, AI takes over the role of micro-scaffolding, while lecturers play the role of macro-scaffolding. These

findings confirm Vygotsky's view of the Zone of Proximal Development (ZPD), that optimal learning occurs when learners receive gradual assistance that allows them to move from actual ability to developmental potential. AI provides a range of technical assistance that is responsive, but cannot completely replace the meaningful interactions provided by human mediators.

Although the benefits of AI are very dominant, this study also reveals a number of challenges that need to be looked at. AI sometimes provides corrections that are too rigid or not in accordance with the pragmatic context, so students need clarification from lecturers. This supports the criticism of experts that automated language assessment is not yet fully able to understand the social, rhetorical, and situational aspects of language. In addition, some students show a tendency to accept AI feedback without conducting a critical evaluation, so lecturer assistance is needed to ensure that the feedback is truly understood and not just followed.

INFORMED CONSENT STATEMENT

Participation in this study is entirely voluntary. By agreeing to take part, the participants acknowledge that they have been informed about the purpose, procedures, potential risks, and benefits of the study. Participants understand that their identity is kept confidential and that all information they provide are used solely for research purposes. They have the right to withdraw from the study at any time without any penalty or loss of benefits to which they are otherwise entitled. By continuing, they give their informed consent to participate in this research under the conditions described.

DATA AVAILABILITY STATEMENT

The data utilized in this study cannot be made publicly available due to strict adherence to privacy concerns and ethical obligations that safeguard participant confidentiality. This ensures compliance with ethical research standards and data protection regulations. However, researchers or interested parties who require access to the dataset for validation or further analysis may request it. Such requests will be considered on a case-by-case basis and must be deemed reasonable. Importantly, approval from the appropriate institutional ethics review board is mandatory before any data can be shared, to ensure that the proposed use aligns with ethical guidelines and participant consent terms.

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