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Improving ESP Vietnamese learners' EFL speaking fluency and vocabulary with DMGA scaffolding: a modular approach

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ABSTRACT

Teaching English as a foreign language (EFL) speaking in an English for specific purposes (ESP) classroom can be challenging as many Vietnamese students find it difficult to master this language skill. To address this issue, scaffolding is believed to be beneficial in language learning programs. This paper aims to investigate the effectiveness of the Diagnosing, Modeling, Sharing, Guiding, and Applying (DMGA) scaffolding-based module on improving the speaking skills of ESP Vietnamese learners at a public university in Vietnam in terms of fluency and vocabulary use. The study employed a quantitative method with an experimental design. The participants were 25 ESP undergraduates. The English-speaking performance test (ESPT), which served as a pretest and posttest, revealed that most posttest indicators improved from pretest values, though significance and size effects varied. Students performed significantly better in both breakdown fluency and speech rate, but there was no progress in repair fluency. While there was no statistically significant improvement in all vocabulary metrics (type-token ratios (TTR), voice-to-text ratio (VOCD), English vocabulary profile (EVP)), the students did achieve higher mean scores on the measures of vocabulary used in the post-test. Based on the findings, the DMGA scaffolding model should be applied to teach speaking skills in ESP settings within an EFL context to benefit both teachers and learners.

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1. INTRODUCTION

In Vietnam, English instruction has been in the limelight since the Ministry of Education and Training launched the National Foreign Language 2025 Project in 2008, focusing on innovating English instruction, particularly improving oral communication skills [1]. However, despite government and educator initiatives and advancements in English language education, many Vietnamese English as a foreign language (EFL) students consider speaking one of the most difficult language abilities, and their speaking abilities in real-life situations are insufficient to fulfil society's increasing demands [2]–[5]. As a result, it is the role of language teachers to help students enhance their language-speaking skills. As an English teacher in the English for Specific Purposes Department (ESPD) at the University of Foreign Language Studies-The University of Danang (UFLS-UD), the first co-author of this study was motivated to identify strategies to provide effective support and assistance, which is so-called scaffolding, to boost students' speaking performance in the EFL speaking classroom.

There has been a growing interest in teachers' scaffolding in language classrooms in recent years, as linguistic help is fundamental to students' language development [6], [7]. Scaffolding originated from the concept of zone of proximal development (ZPD) in Vygotsky's sociocultural theory, which is claimed to play a significant role in assisting a child's progression into his ZPD. It was then adopted by Wood *et al.* [8], who defined scaffolding as adult support that can assist learners in problem-solving activities, highlighting the difference between what students can do with and without scaffolding. Khaliliaqdam [9] suggested that because learning and development interaction serves as a mediator for language acquisition, scaffolding could be used to help adults learn foreign languages more quickly and effectively. Scaffolding has also been shown to positively influence speaking skills, and it is an appropriate approach to use in speaking classes because it can improve students' speaking achievement [10]–[20].

Many scaffolding models have been developed in different teaching contexts in recent decades. Renshaw [21] investigated the initiation, response, and evaluation (IRE) format as a durable social framework for scaffolding classroom learning and then extended it to include students' cultural diversity. Vietnamese language classrooms, however, are not multicultural like Renshaw's, where students are from diverse and minority communities. The Predict, Observe, Experience, and Evaluate (POEE) scaffolding intervention model by Mamun [22] improves online, self-directed student engagement and learning. Nevertheless, stages like "observe" and "experience" are intended for science instruction, not language instruction. Meanwhile, the "Model of Contingent Teaching" (MCT) conducted by Pol *et al.* [23] is the ideal model for interactional scaffolding where the teacher's contingent scaffolding is based on student competency. However, since this study provided both design-in and interactional scaffolding, only diagnostic strategies were adopted to develop the scaffolding framework. Besides, the "Gradual Release of Responsibility" (GRR) developed by the Department of Education of Western University is intended for spoken language teaching as a first language [24], emphasizing the teacher's transfer of responsibility to students. So far, this model appears to be the most appropriate for EFL; nevertheless, some modifications have been made to achieve the best results. Thus, this study's scaffolding model Diagnosing, Modeling, Sharing, Guiding, and Applying (DMGA) has modified two later models to form the intervention framework, as shown in Figure 1. The four stages of DMGA have exposed scaffolding traits, including contingency, fading, and transfer of responsibility. DMGA emphasizes the teacher's degree of control and the transfer of responsibility for learning and task completion to students, which may facilitate the implementation of a student-centered approach in education [25].

Nhi and AlSaqqaf [26] examined the DMGA scaffolding module's impact on learners' speaking performance. The results showed significant improvement in the intervention group's (IG) post-test scores, while the control group showed no notable change. This follow-up study investigates how the DMGA model enhances speaking fluency and vocabulary use among Vietnamese English for specific purposes (ESP) learners at UFLS-UD. To achieve this aim, this study analyzes the students' English-speaking performance test (ESPT) results to answer the research question: "How does the DMGA scaffolding-based module help improve the speaking fluency and vocabulary use among the Vietnamese ESP learners at UFLS-UD?"

2. RESEARCH METHOD

2.1. Research approach and research design

This study used a quantitative approach to assess the impact of the DMGA model on student speaking performance since this approach allows for wider data gathering and statistical analysis and enhances monitoring changes' reliability [27]. A quasi-experimental design compared a group using the DMGA model with a control group using traditional instruction. Pretest and post-test scores were analyzed to evaluate the intervention's effectiveness.

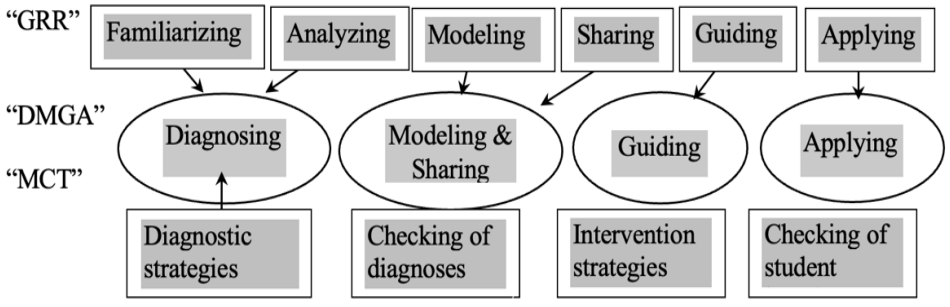

Figure 1. The adaptation of "DMGA" model [25]

2.2. Sampling technique and samples

The study used convenience sampling in the intervention stage because of its convenient availability and easy accessibility. A total of 25 first-year undergraduate students from the ESP Department at the University of Foreign Language Studies, University of Danang (UFLS-UD) were randomly assigned to the IG by the Department of Academic Affairs as part of a regular course. Cohen *et al.* [28] recommend a minimum sample size of 15 cases per group; therefore, 25 cases is an adequate sample size for this investigation. The first-year students were chosen because their outcomes may accurately reflect the intervention's influence when their background English competence was quite similar. These students had completed the same English program in high school and had an average English proficiency that spans from around common European framework of reference for languages (CEFR) level 3 [29]. Since the participants were first-year students, they were between their 18s and 19s. Among the 25 students in the IG, there were 23 females (92%) and two males (8%).

2.3. Research instruments

The ESPT was used as the pre-test and post-test and was statistically analyzed to examine whether there was a significant change in students' EFL speaking fluency and vocabulary use. The Wilcoxon test was used as a non-parametric alternative to the paired samples t-test due to the recommendation that the t-test should be employed with a sample size of at least 30, whereas the present research only included 25 [30]. Measurement tools, including the Descript App, Adobe Audition App, and Test Inspector, were used to quantify the metrics of fluency and vocabulary used.

2.4. Research procedures

This study was conducted in two phases: intervention and evaluation. The intervention stage focused on the implementation of the designed teaching and learning module based on the DMGA scaffolding model. The intervention was implemented during the second semester of the academic year, which spanned 16 weeks and consisted of 17.5 hours of instructional time. The evaluation stage aimed to respond to the research question: "How does the DMGA scaffolding-based module help improve the speaking fluency and vocabulary use among the Vietnamese ESP learners at UFLS-UD?." At this point, the quantitative approach was conducted through the pre and post-test in the form of the ESPT.

3. RESULTS AND DISCUSSION

This section explains the results of the research question and at the same time, it provides a comprehensive discussion. An analysis was conducted to assess the impact of the DMGA scaffolding-based module on two key variables: fluency and vocabulary use. According to Iwashita *et al.* [31], these two features are regarded as the most powerful metrics for evaluating students' speaking performance. To speak a foreign language, learners must quickly and easily recall the correct vocabulary and be able to put words together in a way that makes sense with little hesitation [32]. The results of the study were given in two distinct sections.

3.1. Fluency

Fluency is one of the most important speaking indicators regarding the ability to produce the second language (L2) smoothly and naturally in real-time without undue pausing or unnatural hesitations [33]. According to Park [34], measuring fluency is the first step in measuring speaking proficiency. The study adopted the three main dimensions of fluency measures suggested by Skehan [33], which include breakdown fluency, repair fluency, and speed fluency, for example, the speech rate. Detailed explanations of each indicator are provided in the sub section.

3.1.1. Breakdown fluency

Breakdown fluency measures both silent pauses (unfilled pauses) and filled pauses, whose frequency has been shown in earlier research to be a major differentiator between fluent and disfluent speakers [35]. It is generally accepted that more fluent students take fewer pauses [36]. The ratio of breakdown fluency is calculated by adding up the number of filled and unfilled pauses in each recording. The measurement is illustrated in Table 1.

To begin with, when compared to the pre-test, the filled pause ratio in the post-test is lower (6.44 as opposed to 10.91), as is the unfilled pause ratio (33.68 as opposed to 41.50). On average, the breakdown fluency in the post-test is lower than it was in the pre-test (40.12 vs. 52.41). The mean score of breakdown fluency is described in Figure 2. The data was also analyzed using Wilcoxon paired sample correlations to determine whether the difference in breakdown fluency was significant. The descriptive results from the

Wilcoxon revealed that the filled pause and unfilled pause rates did have major changes when they got a sig. value of p=0.00 and p=0.04, respectively, which meet the criteria for statistical significance (p<=0.05). The overall breakdown fluency in the posttest was also much lower than in the pretest, with a sig. value of p=0.00 and a large effect size (r=0.63). According to Cohen criteria [37], a small effect is defined as a value of 0.1, a medium effect as 0.3, and a large effect as 0.5. Based on the statistics, there were noticeably fewer pauses in the posttest, which means students speaking performance in the posttest was much less silent, and they spoke less hesitantly than they did in the pretest.

Table 1. Measurement of breakdown fluency

Steps	Measured by	Software	Formulation
Step 1: filled pauses	Meaningless words or sounds like "um, uh, er"	Descript App	Filled pauses= (filled pauses/total amount of time in seconds) x 60
Step 2: unfilled pauses	The number of times students are silent equal to or more than 250 milliseconds (ms)	Adobe Audition App	Unfilled pauses= (unfilled pauses/total amount of time in seconds) x 60
Step 3: breakdown fluency	The sum of filled pauses and unfilled pauses		Breakdown fluency= [(filled pauses+unfilled pauses)/total amount of time in second) x 60]

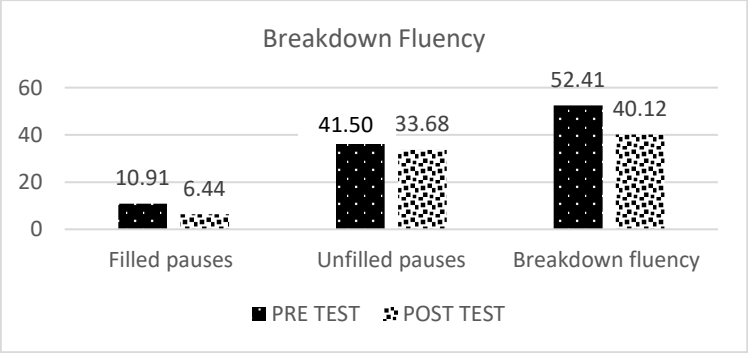

Figure 2. Breakdown fluency mean score

3.1.2. Repair fluency

Repair fluency was measured by counting the number of repetitions (repeated exact words, syllables, or phrases), replacements, and reformulations [38]. The AS unit (analysis of speech) [39], which was recently used in oral analysis by many researchers [40], was adopted to calculate the repair fluency. It was calculated by the number of repairs students make per speaking time in seconds [32], as in (1).

$$Repair\ fluency = \left(\frac{number\ of\ repairs}{total\ time\ in\ the\ recording\ in\ seconds}\right) x60 \quad (1)$$

The number of repairs in the post-test is shown to have no change, with M=3.72 in comparison to M=3.32 in the pre-test. It seems that, in the posttest, students still made many repetitions and adjustments to their fluency to rectify their speech.

3.1.3. Speech rate

Speech rate is a basic fluency metric that is often used as the initial stage since it is simple to quantify [34]. Calculating speech rate included dividing the total number of syllables produced in a certain speech sample by the total period, which was measured in seconds [31], [41], [42]. The transcribed speech was first edited by removing any references to repair; then, the total number of syllables that remained after the editing process was divided by the total length of the speech, eliminating any pauses that lasted three seconds or more [40]. The results show that the speech rate in the post-test is significantly higher than in the pre-test, with a mean score of M=2.02 compared to M=1.04, and p=0.00, showing that students generated more words in less time in the post-test than they did in the pre-test. It indicates that students performed their speaking test faster and more smoothly than they did in the pre-test. It is noted that longer and faster narratives are frequently graded higher, and higher proficiency levels have a higher speech rate than lower ones [34], [43].

In general, based on the data analysis, there was a significant improvement in students' fluency as both breakdown fluency and speech rate showed a positive change in the post-test compared to the pre-test,

as presented in Table 2. The findings indicated that students in the IG increased their overall breakdown fluency by considerably lowering silence time. Remarkably, in both pre- and post-tests, the students had a greater proportion of unfilled pauses than filled pauses. Since these students are freshmen who received most of their English teaching in high school in reading and grammar, it takes them some time to think, arrange ideas, and then translate them into English before creating speech output. Besides, according to Lennon [35], as speakers become more fluent, their speech rate rises, and there are fewer pauses and hesitations in their speech. Lu [43] also found that speech rate has a big effect on speaking skills, as narratives with higher scores tend to be longer and spoken faster than those with lower scores. As a result, the present study's results on speech rate show an improvement in students' speaking competency in the posttest, as higher proficiency levels had a higher speech rate than lower proficiency levels [34], [35]. Moreover, Jafarigohar [16] experimental investigation is also partly similar to the current research. The fluency t-test, which focused only on speech rate improvements, revealed statistically significant differences between the experimental and control groups. It suggested that metacognitive scaffolding, which arose in stage four (application) of the DMGA scaffolding model, might help participants improve their oral fluency. It also supports Ghasedi *et al.* findings [19] that grouping works or exercises in asymmetrical or symmetrical scaffolding had a substantial impact on speaking subcomponents, notably on fluency. Comparable results were obtained by Saienko and Nazarenko [18], who used scaffolding techniques called speaking frames to teach speaking to ESP students. The finding showed that it can help students reduce hesitations, false starts, pauses, and the number of repairs.

Table 2. Fluency statistics

Linguistic resources	Differences	Sig value (p)	Effect size (r)
Filled pauses	V	0.00	0.65 (Large)
Unfilled pauses	V	0.04	0.41 (Medium)
Breakdown fluency	V	0.00	0.63 (Large)
Speech rate	V	0.00	0.79 (Large)

In addition, the current study employed a variety of scaffolding strategies in different stages of the DMGA model to help learners actively apply language structures within a more interactive context. During the third and fourth stages of the DMGA model (guiding and applying), students had more opportunities to practice and independently work on their speaking tasks. They became accustomed to working in pairs, role-playing, and presenting in groups or individually, hence improving the impact of comprehensible input and establishing real-world situations to optimize speech output [44]. Consequently, when given dialogic or monologic tasks in the SPT, students could better plan and deliver their speech, as asserted by Nation [45] that fluency development needs practice and repetition, and the more, the better.

The only fluency measurement in which students did not show any significant improvement was repair fluency. It can be explained that students in the post-test were more concerned with correctness, including grammar, vocabulary, and pronunciation, and hence were more likely to repair and fix their speech to improve their language accuracy. Analyzing the repair fluency, Shooshtari [46] came to a quite similar conclusion when both quantitative and qualitative examinations of the data revealed no improvement in the number of repairs in the post-test.

3.2. Vocabulary use

Another method of evaluating L2 speaking performance is to look at how effectively students use vocabulary in their spoken responses, as Iwashita *et al.* [31] proposed that vocabulary use is a good predictor of candidate speaking performance according to proficiency level. The total number of words (tokens) and the range of different words (types) used in spoken text are the core measures of lexical diversity [34]. Besides, the Type-Token Ratios (TTR), Vocabulary Diversity (VOCD), and English Vocabulary Profile (EVP) were also used as metrics for vocabulary use in this study. In addition, the TTR, VOCD, and EVP were utilized as metrics for vocabulary use in this study. These metrics are explained in further depth in the subsequent sections.

3.2.1. Tokens and types

In this research, there were substantial increases in both the number of words produced (tokens) and a wider range of words used (types) in the post-test compared to the pretest. As demonstrated in Figure 3, nouns, verbs, adjectives, and adverbs were among the parts of speech that witnessed significant increases with large effect sizes, while pronouns showed a decline. The study findings were somewhat compatible with Iwashita *et al.* research [40] that the higher the level, the more words and nouns were created and that

although the number of words and verbs grew with the level of performance, the use of pronouns declined. According to Iwashita *et al*. [31], the token measure was meant for slower speech, resulting in fewer tokens for weaker participants, whereas the type was meant for more proficient speakers who used more types. Similarly, several researches [47], [48] found that higher levels of spoken English language proficiency were shown by greater lexical output and less reliance on high-frequency vocabulary. Therefore, the study's post-test data revealed an increase in the production of both word types and tokens, which indicates an improvement in students' speaking skills in the post-test.

3.2.2. Type-token ratios and voice-to-text ratio

The type-token ratios (TTR), introduced by Johnson [49], is often used by language researchers to evaluate a test taker's lexical diversity. The text's type-token ratio is the number of unique words (types) divided by its running words (tokens) [50], as in (2).

$$TTR = \frac{ntypes}{ntokens} \quad (2)$$

However, several researchers found that the TTR index decreases as the length of the text rises [51]–[53]. Thus, in addition to TTR, the VOCD index was also opted for, which accounts for text length. These measures were selected following successful use in previous study [31]. The TTR and VOCD were automatically calculated in this study using the Text Inspector tool [54], where the researcher copied and pasted the transcriptions of test takers onto the website. After gathering all necessary data, parametric Wilcoxon was used to compare pre and post mean scores. The results showed that the TTR mean score on the post-test was 0.40, lower than the pretest value of 0.49. It is partially consistent with Iwashita *et al.* study [31] that lower-level candidate performances had higher TTR than higher-level candidate performances. According to several researches, as the type-token ratio is related to text length [53], the TTR index normally declines with text length [40], [47], [52]. Meanwhile, the VOCD mean score rose by 1.73 with a sig. value of 0.48, a small effect size, as illustrated in Table 3. Many studies have linked lexical diversity to L2 competence and speaking ability, with lexical variety rising with skill level [48]. Hence, the present study found a little increase in lexical variety in students' post-test speaking ability, indicating that the intervention improved their speaking abilities.

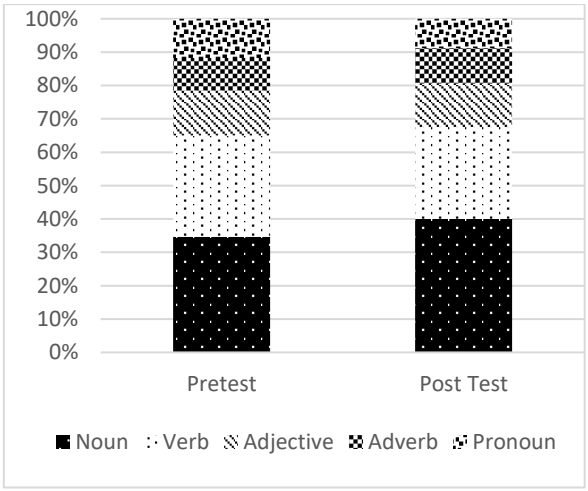

Figure 3. Distribution of vocabulary use

Table 3. Descriptive statistics of VOCD

	N	Mean	Std. Deviation	Minimum	Maximum	Effect size	Sig. value
Pre VOCD	25	45.59	14.24	24.99	69.72	-0.06 (Small)	0.48
Post VOCD	25	47.32	12.95	26.22	73.97		

3.2.3. English vocabulary profile

This research also examined the EVP indicator, created by Cambridge University Press, to assess vocabulary use. The EVP analysis helps classify students' vocabularies by the common European framework's six levels: A1, A2, B1, B2, C1, and C2. Since C2 scored 0% overall, its data were removed

from the analysis. The Text Inspector was used to measure the items included in the vocabulary use assessment. The results showed that there was not much difference in the EVP indicator of the post-test, as shown in Figure 4. The vocabulary at all levels saw a small gain, except for A1. The rates in A2 and B2 rose by almost 3%, while C1 stayed at about 0.71% to 1.04%. The most striking feature is B1, which almost doubled from 8.46% to 15.15%. Understandably, students were at the A2 level at the time of the intervention, intending to progress to the B1 level at the end of the course. Thus, the fact that their vocabulary use has decreased at the A1 level while increasing at the B1 level indicates that their vocabulary use has had some improvement. As a result, according to the CEFR categorization of vocabulary levels, most students have progressed from being basic users to being independent users after the intervention.

The study's findings on vocabulary use are somewhat consistent with previous studies [13], [19], who advocated scaffolds as useful methods for enhancing most aspects of speaking that were studied in the research, including vocabulary. As inferred from the research results, it is possible to claim that the DMGA scaffolding model used in the intervention may have aided students in employing a larger variety of vocabulary, resulting in increased output of word types and tokens, greater lexical diversity, and a higher level of vocabulary use. Uchihara [55] has acknowledged the relationship between productive vocabulary and lexical use in speech, in that productive vocabulary knowledge substantially corresponds with lexical diversity and complexity. They hypothesized that L2 speakers with a wide productive vocabulary might create lexically complex and rich language faster and with fewer pauses. Additionally, it is considered that there are large correlations between vocabulary knowledge and fluency, notably speed fluency, which suggests that learners with vast lexicons may speed up their total speech output [56]. Therefore, it is possible to conclude that the DMGA scaffolding model applied in the intervention may have been of assistance to students in their better use of vocabulary while speaking.

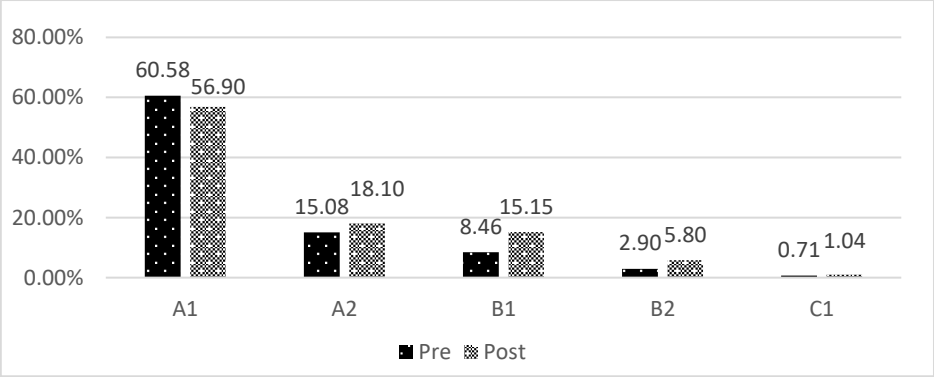

Figure 4. The English vocabulary profile

4. CONCLUSION

This study offers significant implications for educational practice. It shows that the DMGA method enhances students' speech fluency by reducing pauses and increasing speech rate. The study also highlights the potential of the DMGA model as a pedagogical framework for developing scaffolded learning activities, emphasizing student responsibility. Additionally, it underscores the importance of adopting a student-centered approach, which may be challenging in Vietnam's Confucian-influenced, teacher-led education system. Teachers must assess students' independent capabilities and choose appropriate scaffolding strategies. Lastly, the study suggests that curriculum design should authentically address learners' needs and expectations in the local context.

Future research could benefit from a more extended intervention to demonstrate the gradual impact of scaffolding over time. Additionally, applying the scaffolding model to other language skills, such as reading and writing, would be valuable. Research could also explore its effectiveness with lower-level EFL learners or within different educational settings. Furthermore, developing a virtual version of the DMGA scaffolding model for use as an e-learning tool in speaking courses presents an intriguing avenue for future research. Finally, this research also proposes a long-term strategy for innovating English teaching and learning, which is a core goal of the Vietnam National Foreign Language Project 2025.

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