Reconceptualizing Grammar Development through Dynamic Assessment: Differential Effects across Achievement and Proficiency Levels in Secondary EFL Classrooms

Abdelhamid Ahmed Khalil[1], Emad A.S Abu-Ayyash[2], Amr M. Mohamed[3]

[1] Languages & Culture Department, College of Humanities and Sciences, Ajman University, UAE. https://orcid.org/0000-0001-7530-0903

[2] Faculty of Education, The British University in Dubai, UAE. http://orcid.org/0000-0002-6860-3233

[3] Medical Sciences and Preparatory Year Department, North Private College of Nursing, Arar, Northern Border, Saudi Arabia. https://orcid.org/0000-0003-3891-963X

Correspondence: Amr M. Mohamed, Medical Sciences and Preparatory Year Department, North Private College of Nursing, Arar, Northern Border, Saudi Arabia.

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Abstract

This study examines how Dynamic Assessment (DA), a Vygotskian conceptualization of the Zone of Proximal Development (ZPD), can influence the grammatical development of Emirati EFL students at the secondary level. The quasi-experimental study, which employed a sequential explanatory mixed-methods design, followed an intervention with 140 twelfth-grade students to compare instruction mediated by DA with Non-Dynamic Assessment (NDA). The respondents were classified by achievement (low, average, high) and proficiency (general vs. advanced) to test the interaction effect. Quantitative data showed that students who received DA achieved a much larger improvement in grammatical accuracy than those who received the NDA. Interestingly, the greatest improvement was observed among the low achievers, indicating that DA is successful in engaging underdeveloped ZPD potential, whereas advanced-proficiency learners also responded better to mediation than their general-proficiency counterparts. These findings were supported by qualitative data from 20 semi-structured interviews, which demonstrated perceptions of the roles of graduated mediation, dialogic feedback, and scaffolded support in reducing anxiety and improving metacognitive engagement. The results not only extend the existing body of research on DA but also show the extent to which it applies to large EFL classrooms and indicate how learners' characteristics mediate reactions to the assessment-as-instruction. ZPD-informed grammar instruction has pedagogical and theoretical implications that are addressed with respect to similar EFL situations.

Keywords: dynamic assessment, non-dynamic assessment, performance level, twelfth graders, grammar achievement, proficiency level

1. Introduction

Assessment in second language education has traditionally prioritized independent performance as the primary indicator of competence (Brown & Hudson, 1998; Hessamy & Ghaderi, 2014). However, sociocultural perspectives challenge this view, framing development as mediated and emergent (Lantolf, 2006; Lantolf & Thorne, 2006; Poehner et al., 2018). In many EFL contexts, assessment and instruction remain separated, limiting evaluation to complete performance while obscuring learners' potential for growth under guided support (Abdulrazzaq & Abdellatif, 2023; Farhady & Tavassoli, 2021).

Dynamic Assessment (DA), based on Vygotsky's (1978) sociocultural theory of assessment, redefines assessment as a developmental process through the entrenchment of mediation in evaluation. Instead of treating ability as fixed, DA explores learners' responsiveness to structured support in their Zone of Proximal Development (ZPD) (Lantolf & Poehner, 2004; Poehner, 2008). In this respect, interaction does not contribute to measurement bias but is the process by which development can be observed. This stance is in opposition to non-dynamic assessment (NDA), which only evaluates independent performance but excludes mediation as a dimension of analysis (Hidri, 2019; Rashidi & Nejad, 2018).

Recent studies have broadened DA research across linguistics and affective science. It has been demonstrated that both interactionist and interventionist models can improve the accuracy of speaking and fluency, decrease anxiety in the classroom, and boost motivation in a foreign language (Ritonga et al., 2022). There is also some comparative evidence indicating that linguistic results may be influenced more by mediation format, so interactionist DA would promote more accurate grammar and vocabulary richness, and interventionist DA would promote fluency and vocabulary richness (Sarabi Asl et al., 2024). Computerized dynamic assessment (C-DA) represents technological advances that have also been shown to improve grammatical knowledge (Behbahani & Karimpour, 2024), highlighting the development of DA methodology.

In grammar instruction, interventionist DA has been found to yield substantial gains in proficiency levels (Estaji & Ameri, 2020; Motabar

& Babaie Shalmani, 2024). However, much of the literature is effectiveness-based, focusing mostly on comparisons between DA and non-dynamic conditions. There has been less focus on the mediation of learner characteristics to responsiveness to structured intervention. Based on the sociocultural perspective, this omission is consequential. Provided that learners' ZPDs are activated, the developmental advantages must depend on learners' initial location in the educational environment.

Specifically, the difference between achievement and proficiency is an issue that needs to be considered. Achievement is the performance in reference to the curricular objectives, whereas proficiency is a wider linguistic competence. Such constructs can also have a differentiating influence on the access and use of mediation. Low-achieving learners can show significant improvement when mediation opens untapped potential, but high-proficiency learners can exhibit different growth patterns. Since the effects of moderation have been studied only to a limited extent, especially in secondary-level EFL classrooms with heterogeneous student groups, it is important to investigate them empirically.

The current research fills this gap by investigating the interaction between interventionist Dynamic Assessment and learners' achievement and proficiency levels to determine the effect of Dynamic Assessment on grammar development among EFL students in twelfth grade. The study, which relies on a quasi-experimental design and supports it with the use of qualitative data, does not provide binary comparisons between the two forms of treatment: DA and NDA, instead examining the differences in the responsiveness to mediation. The analysis of the learner variables and the type of assessment helps to deepen the insight into the mechanisms of the functioning structured mediation within large secondary classrooms and makes it clear to whom the interventionist DA will have the most beneficial impact in supporting grammatical development.

2. Literature Review

2.1 Theoretical Framework and Conceptual Positioning of Dynamic Assessment

Dynamic Assessment (DA) originates from Vygotsky's (1978) Sociocultural Theory (SCT), which positions learning as a socially mediated process rather than individual knowledge acquisition (Farhady & Tavassoli, 2021; Sarmiento-Campos et al., 2022). Central to this framework is the Zone of Proximal Development (ZPD), the distance between independent performance and achievement through guided mediation (Vygotsky, 1978). As Figure 1 illustrates, development emerges within this dynamic space where assistance activates latent potential (Pathan et al., 2018; Toomaneejinda, 2017).

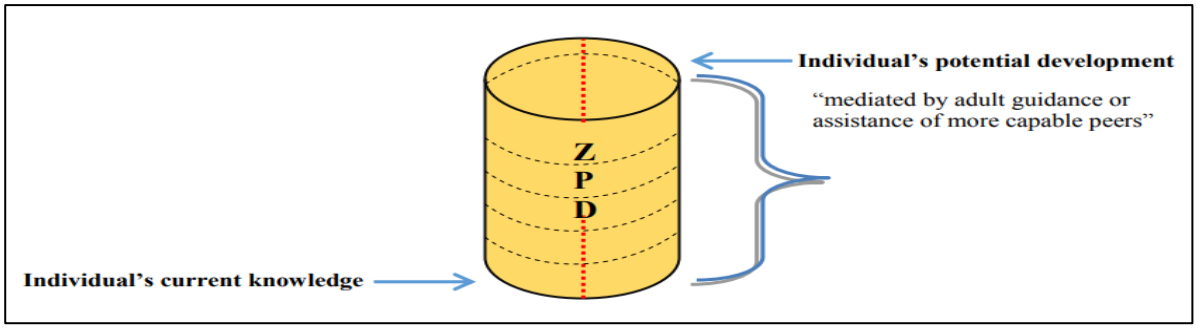

Figure 1. An illustration of Vygotsky's ZPD (Toomaneejinda, 2017)

In contrast with Non-Dynamic Assessment (NDA), which measures solo performance (Tzuriel, 2001; Rashidi & Nejad, 2018), ZPD is operationalized through the mediation role of the assessor in DA (Poehner, 2008), placing the teacher in a position of both assessor and mediator (Poehner & Infante, 2015). DA scholarship draws a distinction between interactionist models (contingent, dialogic mediation) and interventionist (standardized, scripted procedures) models (Poehner & Lantolf, 2023). It has been found that interactionist DA leads to better grammar and vocabulary development, whereas interventionist DA leads to greater fluency improvement (Sarabi Asl et al., 2024). The two models are more accurate and motivating, and less anxious than non-DA models (Ritonga et al., 2022). DA is also diagnostic with dynamic measures, suggesting the potential to learn better than with static measures (Dixon et al., 2023).

Despite this grounding, grammar is a poorly studied area (Beigi et al., 2020; Daneshfar et al., 2018), and little research has examined the role of learner variables as a mediating factor in relation to interventionist DA. This paper fills these gaps by studying the application of intervention-based DA, operationalized using the sandwich format (Sternberg & Grigorenko, 2002), to produce different effects on grammar development, as measured by achievement and proficiency levels, in an EFL secondary setting.

2.2 Models of Dynamic Assessment: Interactionist and Interventionist Approaches

Current research on DA identifies two major models: interactionist and interventionist (Poehner & Lantolf, 2023). The interactionist style involves adaptive, dialogic mediation tailored to learners' needs, while the interventionist model involves standardized, scripted procedures conducted in an orderly, systematic manner, most often in a pretest-mediation-posttest design.

Empirical comparisons have yielded conflicting results: Sarabi Asl et al. (2024) found that interactionist DA leads to better grammatical accuracy, pronunciation, and vocabulary depth, whereas interventionist DA yields higher scores in fluency and vocabulary depth. Ritonga et al. (2022) showed that the two models had a significant positive impact on speaking accuracy and fluency, a decrease in

foreign-language classroom anxiety, and an increase in motivation, compared with non-DA methods.

These findings indicate that the model selection must align with the instructional objectives. The quasi-experimental format is especially appropriate for the interventionist approach, which is structured and replicable (Lantolf & Poehner, 2004). This study, therefore, uses an interventionist approach to systematically examine grammar development across groups of learners. The present study adopted the interventionist model because its standardized mediation procedures are better suited to quasi-experimental comparisons across intact secondary classrooms.

2.3 Operationalizing the Interventionist Model: The Sandwich Format

The sandwich format is one of the main procedural schemes of the interventionist tradition (Sternberg & Grigorenko, 2002). The model entails three phases: pretest, mediation and post-test. Standardized mediation based on identified challenges is applied to learners after the initial evaluation of baseline competence. The identical or similar test is then repeated to determine developmental change (Daneshfar & Moharami, 2018).

The sandwich format aligns with experimental research designs, as it enables a statistical comparison of pre- and post-mediation performance (Lyu & Wei, 2020). The schematic view of this process is presented in Figure 2, which shows how the mediation is placed between two equal assessment stages (Dörfler et al., 2009).

Figure 2. A representation of the interventionist sandwich approach of DA (Dörfler et al., 2009)

This standardized configuration echoes Vygotsky's early quantitative applications of mediation (Safa & Beheshti, 2018) and ensures consistency across large participant groups. Given the present study's aim to measure grammar achievement across achievement and proficiency levels, the interventionist sandwich format provides methodological rigor while remaining theoretically grounded in the ZPD.

2.4 Dynamic Assessment versus Non-Dynamic Assessment

As opposed to Dynamic Assessment (DA), Non-Dynamic Assessment (NDA), or a static assessment, does not rely on instruction by forbidding the intervention of the examiners (Miri et al., 2017; Motabar & Babaie Shalmani, 2024). Under this traditional method, students present their knowledge without any support, as examiners simply take notes (Ebadi & Yari, 2017; Hidri, 2019; Tzuriel, 2001; Rashidi & Nejad, 2018).

Despite the logistical benefits of NDA, e.g., its efficiency and cost-effectiveness in large-scale evaluations (Malmir, 2020; Safa & Beheshti, 2018), critics claim that NDA fails to account for its developmental potential. The strength of static assessment is that it captures only what has been developed, but it usually produces an incomplete picture of learners' abilities (Smith, 2018). NDA omits mediation and supports deficit-based interpretations while ignoring higher-order cognitive mechanisms (Rahmaty & Zarei, 2021; Shakoori, 2022).

Studies outside the field of language education also prove these shortcomings. Dixon et al. (2023) found that dynamic predictors of decoding and phonological awareness showed distinct reading problem variance, especially when used alongside static predictors, highlighting the diagnostic value of DA and its further applicability in education.

2.5 Dynamic Assessment in Grammar Instruction

Grammar is less studied than speaking, reading, and vocabulary in DA (Beigi et al., 2020; Daneshfar et al., 2018). Nevertheless, existing data present a steady positive performance. The sandwich model improved learners' proficiency in conditional structures (Zohoor et al., 2021), whereas mediated instruction improved learners' proficiency in grammar (Kamali et al., 2018). Structured mediation led to gains in grammar and academics (Zhang & van Compernolle, 2016). Recent literature supports these results: computerized dynamic assessment (C-DA) improved grammar performance (Behbahani & Karimpour, 2024) and supported grammar acquisition and retention (Motabar & Babaie Shalmani, 2024). Interaction effects between the assessment type and the level of proficiency were discovered by Estaji and Ameri (2020), with pre-intermediate learners being the most beneficiaries, as has been previously confirmed by research on the effectiveness of DA in teaching grammar (Abbasi & Fatemi, 2015; Kamali et al., 2018; Sharafi & Sardareh, 2016).

Even with positive achievements, there are still gaps. There are still fewer studies that simultaneously examine the relationships among assessment type, achievement level, and proficiency, as well as fewer that examine interventionist DA in large classrooms composed of EFLs in secondary schools. Since grammar is the core competence of communicative competence, it is justified that more studies be done. This paper will fill these gaps and discuss the results of applying interventionist DA to the grammar performance of Emirati twelfth-grade students, focusing on quantitative outcomes and qualitative learner perceptions.

2.6 Research Questions

RQ1: To what extent does interventionist Dynamic Assessment produce greater grammatical development than Non-Dynamic Assessment among secondary EFL learners?

RQ2: How does learners' initial achievement level moderate responsiveness to interventionist Dynamic Assessment in grammar development?

RQ3: How does learners' proficiency level interact with assessment type to influence developmental gains in grammar?

RQ4: How do learners perceive the mediational processes embedded in interventionist Dynamic Assessment, and how do these perceptions relate to their developmental trajectories?

3. Method

3.1 Research Design

The mixed-methods design used in this research was a sequential explanatory design that included a quasi-experimental quantitative stage followed by a qualitative stage. The quantitative aspect determined the impacts of the interventionist Dynamic Assessment (DA) versus Non-Dynamic Assessment (NDA) on grammar achievement among 12th-grade EFL students using a pretest-intervention posttest control-group design, with the type of assessment (DA vs. NDA) as the independent variable, level of proficiency (Advanced vs. General) and achievement level (Low, Average, High) as the moderating variables, and grammar post-test scores as the dependent variables. The qualitative stage was then conducted to further interpret and contextualize the quantitative results by exploring learners' perceptions of the mediation process and how this affects their grammatical growth. Because intact classrooms were used, the findings should be interpreted as indicating associations between the intervention and learning outcomes rather than definitive causal relationships.

3.2 Participants

The participants were 140 Emirati twelfth-grade students enrolled in public secondary schools under the UAE Ministry of Education. Intact classrooms were used to assign students to experimental or control conditions, in accordance with the traditions of quasi-experimental research, with students grouped within existing classes (Cohen et al., 2018).

The official school placement criteria were used to categorize participants by proficiency level, aligned with Ministry benchmarks. The level of achievement was calculated based on the distribution of pretest scores and categorized into the tertiles; low, average and high achievement. Table 1 presents the distribution of participants across experimental conditions and proficiency levels.

Table 1. Summary of sampling for the quantitative quasi-experimental phase

Experimental Group	Control Group
2 classes of grade 12 EFL learners of the advanced and general proficiency levels (n=70)	2 classes of grade 12 EFL learners of the advanced and general proficiency levels (n=70)
High achievers	High achievers
Average-level students	Average-level students
Low achievers	Low achievers
They undertook the DA intervention.	They received NDA.

3.3 Instrumentation

3.3.1 Grammar Achievement Test

The standardized Grade 12 grammar test devised by the Assessment Unit of the UAE Ministry of Education was used to measure grammar development. The instrument was developed by systematically mapping the curriculum to national learning outcomes, followed by expert item writing and review. The last test consisted of 40 multiple-choice questions covering the use of rules, contextual grammar, and identification of errors in the main domains of syntax.

Content validity was achieved through expert opinion from the Ministry's assessment specialists and senior EFL supervisors, ensuring that grammatical structures are aligned with the curriculum standards. The instrument used in the secondary assessment settings also demonstrated construct validity, as it aligned with the national grammar standards and was congruent with existing practices in the assessment field.

Cronbach's alpha was used to re-calculate the internal consistency and reliability of the current sample. Table 2 shows the reliability coefficients of each cohort.

Table 2. Internal Consistency Reliability (Cronbach's Alpha) by Cohort

Cohort	Cronbach's α
12A1	.417
12A2	.522
12G1	.439
12G3	.709

The internal consistency coefficients varied across cohorts. Three values fell below the commonly accepted threshold of .60, indicating limited internal consistency, while one cohort demonstrated acceptable reliability. These lower values were interpreted cautiously and may be attributed to the heterogeneous and multidimensional nature of the grammar achievement test, which assessed multiple grammatical

structures rather than a single homogeneous construct. Therefore, the reliability findings were acknowledged as a methodological limitation and were considered when interpreting the quantitative results.

The instrument was administered electronically via Microsoft Forms under consistent conditions and automatically graded on a 40-point scale. The pretest established baseline equivalence and identified areas of grammatical difficulty. The same instrument was administered as a post-test at the end of the intervention.

3.3.1.1 Intervention Procedures

Pretest results were analyzed to identify recurring grammatical difficulties across groups. Thirteen grammatical structures were selected for targeted instruction over 13 sessions of 45 minutes each. Table 3 presents the instructional sequence.

Table 3. Areas of difficulty dealt with during the DA intervention

Session	Targeted Grammar Structures	Session	Targeted Grammar Structures
1	Subject- verb agreement	8	Present perfect continuous tense
2	Conditional type I	9	Modal verbs
3	Conditional type II	10	Correlative conjunctions
4	Conditional type III	11	Relative pronouns
5	Quantifiers	12	Comparative adjectives
6	Future perfect tense	13	Superlative adjectives
7	Simple past tense		

3.3.1.2 Experimental and Control Conditions

The interventionist model used to provide instructions to experimental groups was a dynamic Assessment model in the form of a sandwich (pretest-mediation-post-test). The mediation processes were based on the regulatory scale by Aljaafreh and Lantolf (1994), which begins with implicit prompts and proceeds to increasingly explicit assistance. In every session, teachers offered graduated mediation in the form of guided questioning, metalinguistic cues, prompted self-correction, peer interaction, and explicit modeling as necessary. Students were given structured grammar activities after instructional activities and the assistance offered contingently based on the principles of DA.

Control groups were taught the traditional approach to deductive grammar as outlined in the national curriculum. The teachers explained the grammatical rules and gave structured practice exercises. Students were expected to complete the same grammar tasks without mediation and scaffolding help.

3.3.2 Qualitative Data Collection

Following the quantitative phase, semi-structured interviews were conducted with 20 students from experimental conditions, evenly divided between advanced and general proficiency levels. The interview protocol was developed based on core DA constructs, including mediation responsiveness, perceived development, affective experience, and learner agency. The instrument underwent expert review to ensure content validity.

Interviews lasted between 30 and 40 minutes, were audio-recorded with informed consent, and transcribed verbatim for analysis.

3.4 Data Analysis

SPSS was used for quantitative analyses. Independent-samples t-tests and Levene Test of Equality of Variances were used to determine baseline equivalence between groups. A two-way ANOVA was performed to investigate the effects of treatments using the following variables: assessment type, level of proficiency, and post-test grammar scores as the dependent variable. Interaction effects were examined to determine whether proficiency level moderates the relationship between assessment type and grammar achievement gains.

The results of ANOVA were reported as partial eta squared (ηp^2) and the results of paired-samples t-tests as Cohen's d. The presence of effect size reporting and statistical significance also ensured the interpretation of both practical and statistical significance (Liu & Wang, 2021).

Reflexive thematic analysis was the method of qualitative data analysis (Braun & Clarke, 2017). The analysis was conducted through iterative coding, developing themes, and refining them to be credible and analytically rigorous.

3.5 Ethical Considerations

The institution's authorities, along with the UAE Ministry of Education, were approached as the relevant authorities to obtain ethical approval before data collection. The participation was voluntary. Written informed consent was obtained from students and their guardians. The participants were assured that their school performance would not be influenced by their participation or non-participation.

All information was coded with number identifiers. Electronic data were stored in password-protected devices and recordings of the interviews were erased after transcription and verification. The privacy and confidentiality of the participants were observed during the research process.

4. Results

4.1 Baseline Equivalence Between Groups

To ensure baseline equivalence, independent samples *t*-tests were conducted on pretest grammar scores for both proficiency levels. The

results shown in Table 3 and Table 4 revealed no statistically significant differences between groups at the advanced level, t = 0.008, p = .993 (two-tailed), or at the general proficiency level, t = 0.050, p = .960 (two-tailed), thereby establishing statistical homogeneity before the experimental phase.

Table 3. Independent samples t-tests for the homogeneity of the advanced proficiency groups

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretest Scores	Equal variances assumed	.168	.683	.008	68	.993	.029	3.379	-6.714	6.771
	Equal variances not assumed			.008	67.2	.993	.029	3.379	-6.715	6.772

Table 4. Independent samples t-tests for the homogeneity of the general proficiency groups

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretest Scores	Equal variances assumed	3.668	.060	.050	68	.960	.143	2.856	-5.557	5.843
	Equal variances not assumed			.050	65.83	.960	.143	2.856	-5.560	5.846

4.2 Results for the First Research Question

To address Research Question 1, which explored the impact of DA versus NDA on EFL twelfth graders' grammar achievement, an independent sample t-test was conducted. As reported in Tables 5 and 6 below, the DA group demonstrated a significant improvement, with a mean gain of 14.18 points (SD = 8.36), while the NDA group showed a smaller gain of 3.04 points (SD = 6.18). The t-test result (t = 8.963, p < .001) confirmed that the DA group outperformed the NDA group, with a mean score difference of 11.14 points. Additionally, Levene's Test for Equality of Variances (p = .007) indicated unequal variances, supporting the reliability of the findings.

Table 5. Group statistics for mean difference between DA and NDA groups

	Type of Assessment	N	Mean	Std. Deviation	Std. Error Mean
Difference	Dynamic Assessment (DA)	70	14.1857	8.36364	.99965
	Non-dynamic Assessment (NDA)	70	3.0429	6.18421	.73916

Table 6. Independent sample t-test for mean difference between groups' post-tests

		Levene's Test for Equality of Variances		*t*-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Difference	Equal variances assumed	7.574	.007	8.96	138	.00	11.14286	1.24324	8.684	13.6011
	Equal variances not assumed			8.96	127.0	.00	11.14286	1.24324	8.682	13.602

Additional ANOVA analysis supported the t-test findings and confirmed significantly higher gains in the DA group, as shown in Table 7.

Table 7. ANOVA test for the mean difference between the experimental and control groups

	Sum of Squares	df	Mean Square	Welch Statistic	Sig.
Between Groups	4345.714	1	4345.714	80.331	.000
Within Groups	7465.457	138	54.098		
Total	11811.171	139			

Post-hoc comparisons further showed that the advanced proficiency DA group achieved the highest gains, while both DA groups significantly outperformed their NDA counterparts, as presented in Table 8.

Table 8. Results of the post-hoc test for individual differences between groups

(I) Participants' Group	(J) Participants' Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
12Adv-NDA	12Adv-DA	-12.74286*	1.93827	.000	-18.0090	-7.4767
	12Gen-NDA	1.91429	1.47093	.724	-2.0666	5.8951
	12Gen-DA	-7.62857*	1.49795	.000	-11.6820	-3.5751
12Adv-DA	12Adv-NDA	12.74286*	1.93827	.000	7.4767	18.0090
	12Gen-NDA	14.65714*	1.89502	.000	9.5009	19.8134
	12Gen-DA	5.11429	1.91607	.057	-.0953	10.3239
12Gen-NDA	12Adv-NDA	-1.91429	1.47093	.724	-5.8951	2.0666
	12Adv-DA	-14.65714*	1.89502	.000	-19.8134	-9.5009
	12Gen-DA	-9.54286*	1.44155	.000	-13.4437	-5.6420
12Gen-DA	12Adv-NDA	7.62857*	1.49795	.000	3.5751	11.6820
	12Adv-DA	-5.11429	1.91607	.057	-10.3239	.0953
	12Gen-NDA	9.54286*	1.44155	.000	5.6420	13.4437

*. The mean difference is significant at the 0.05 level.

4.3 Results for the Second Research Question

Research Question 2, which examined the differential impact of DA on the grammar achievement of EFL twelfth-grade students across performance levels (high, average, and low achievers), was analysed using a one-way ANOVA. As presented in Table 9, the analysis yielded a statistically significant result (Welch Statistic = 15.725, $p < .001$), confirming significant variance in improvement among the groups. Examination of the mean scores indicated a clear pattern: low achievers showed the most substantial improvement ($M = 20.08$, $SD = 9.55$), followed by average achievers ($M = 13.46$, $SD = 6.43$), with high achievers making the most modest gains ($M = 8.61$, $SD = 3.96$). This pattern of differential gains is graphically represented in Figure 3.

Table 9. ANOVA test for mean difference for levels of performance

	Sum of Squares	df	Mean Square	Welch Statistic	Sig.
Between Groups	1465.346	2	732.673	15.725	.000
Within Groups	3361.240	67	50.168		
Total	4826.586	69			

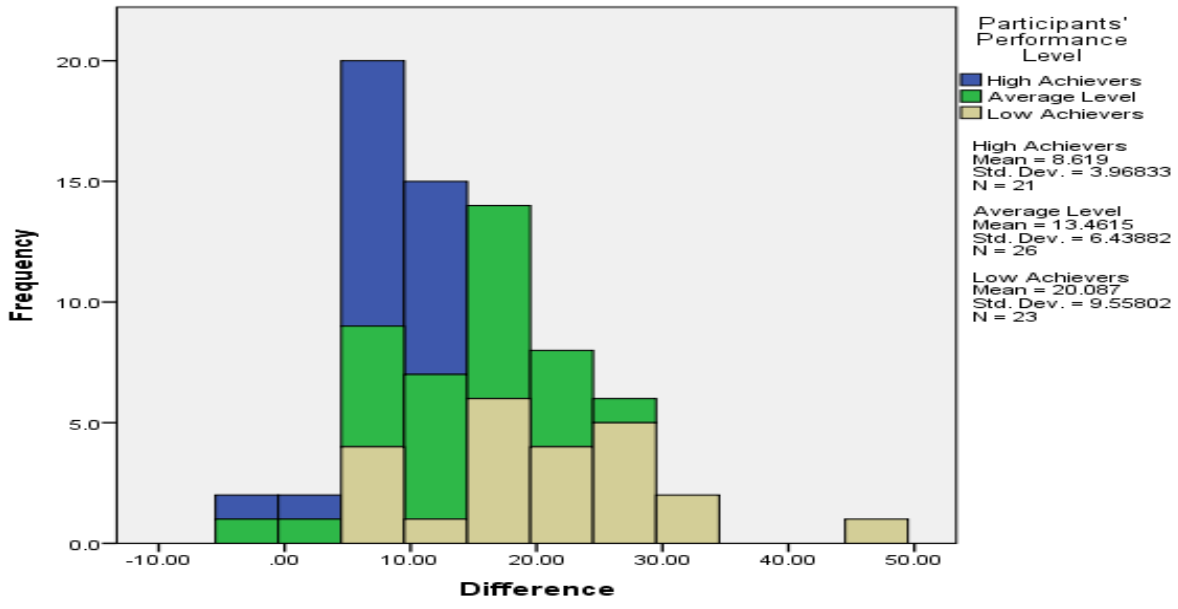

Figure 3. Histogram of the difference in mean across levels of performance

In addition, the results displayed in Table 10 show that post-hoc *Dunnett's T3* comparisons confirmed significant differences: low achievers outperformed average-level ($p = .023$, mean difference = 6.63) and high achievers ($p < .001$, mean difference = 11.47), while average-level students also surpassed high achievers significantly ($p = .009$, mean difference = 4.84). These

findings indicate that DA interventions were especially effective for low-performing students, highlighting the benefits of tailored mediation for learners with greater learning gaps.

Table 10. Results of the post-hoc test for individual differences across levels of performance

(I) Participants' Performance Level	(J) Participants' Performance Level	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
High Achievers	Average Level	-4.84249*	1.53116	.009	-8.6427	-1.0423
	Low Achievers	-11.46791*	2.17299	.000	-16.9498	-5.9860
Average Level	High Achievers	4.84249*	1.53116	.009	1.0423	8.6427
	Low Achievers	-6.62542*	2.35935	.023	-12.5085	-.7424
Low Achievers	High Achievers	11.46791*	2.17299	.000	5.9860	16.9498
	Average Level	6.62542*	2.35935	.023	.7424	12.5085

*** . The mean difference is significant at the 0.05 level.**

The analysis for Research Question 2 revealed statistically significant differences in DA grammar scores among high, average, and low-achieving twelfth-grade EFL students. A two-way ANOVA was conducted to examine the effects of proficiency level (advanced vs. general) and performance level on pre- to post-test score changes. After *Levene's test* confirmed homogeneity of variance ($p = .278$), meeting the ANOVA assumption, the analysis showed a significant overall model ($F = 10.661$, $p < .001$, Table 11). Both main effects were statistically significant: performance level ($F = 17.135$, $p < .001$, $\eta^2 = .394$) and proficiency level ($F = 8.991$, $p = .004$, $\eta^2 = .123$). Furthermore, their significant interaction ($F = 3.967$, $p = .024$, $\eta^2 = .110$) indicated that the effect of one factor depended on the level of the other.

Moreover, profile plots (Figure 4) and interaction tables elucidated these effects. While high achievers in the general proficiency group ($M = 9.091$) slightly outperformed those in the advanced group ($M = 8.100$), low achievers in the advanced group demonstrated markedly greater improvement ($M = 24.833$) than their general proficiency peers ($M = 14.909$). Similarly, average-level students in the advanced group ($M = 15.923$) outperformed those in the general group ($M = 11.000$). These findings indicate that the efficacy of the DA intervention depended on both proficiency level and initial performance, with advanced students, particularly low and average achievers, deriving the greatest benefit.

Table 11. Results of tests of between-subjects effects

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2193.278a	5	438.656	10.661	.000	.454
Intercept	13548.996	1	13548.996	329.295	.000	.837
Performance Level	1410.062	2	705.031	17.135	.000	.349
Group	369.944	1	369.944	8.991	.004	.123
Performance Level * Group	326.452	2	163.226	3.967	.024	.110
Error	2633.308	64	41.145			
Total	18913.000	70				
Corrected Total	4826.586	69				

a. R Squared = .454 (Adjusted R Squared = .412)

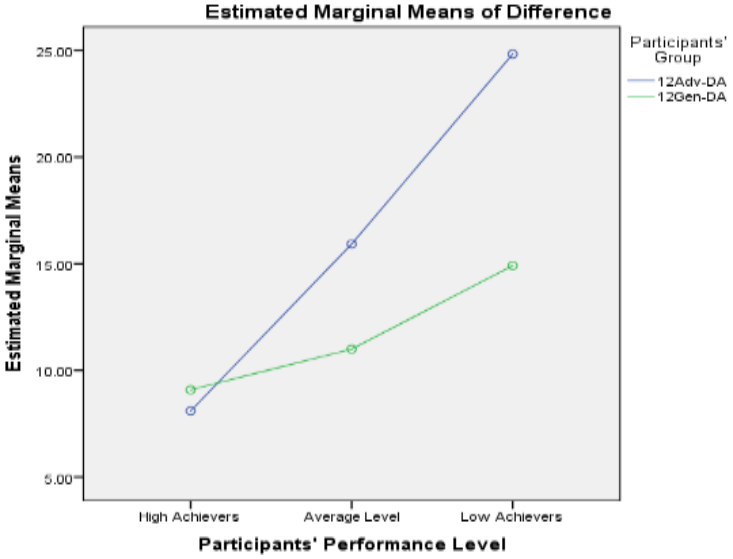

Figure 4. Profile plots of the estimated marginal means for performance levels and groups

4.4 Results for the Third Research Question

To address Research Question 3, the researchers investigated whether DA influenced grammar achievement across different proficiency levels: advanced (12Adv-DA) and general (12Gen-DA). A one-way ANOVA was conducted to compare the mean score differences between the pretest and post-test for these two groups. As shown in Table 12, the results demonstrated a statistically significant difference ($F = 7.124$, $P \leq .010$), with advanced proficiency students ($M = 16.74$, $SD = 9.52$) outperforming general proficiency learners ($M = 11.62$, $SD = 6.14$). This suggests that DA was associated with greater grammatical gains among advanced proficiency learners.

Table 12. One-way ANOVA test for mean difference across proficiency levels

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	457.729	1	457.729	7.124	.010
Within Groups	4368.857	68	64.248		
Total	4826.586	69			

To illustrate the differences in grammar achievement across the two proficiency levels following the DA intervention, Figure 5 displays a means plot of the variation in achievement across groups. Complementarily, Figure 6 presents a histogram that visually compares the mean post-test scores in grammar achievement among learners with different proficiency levels.

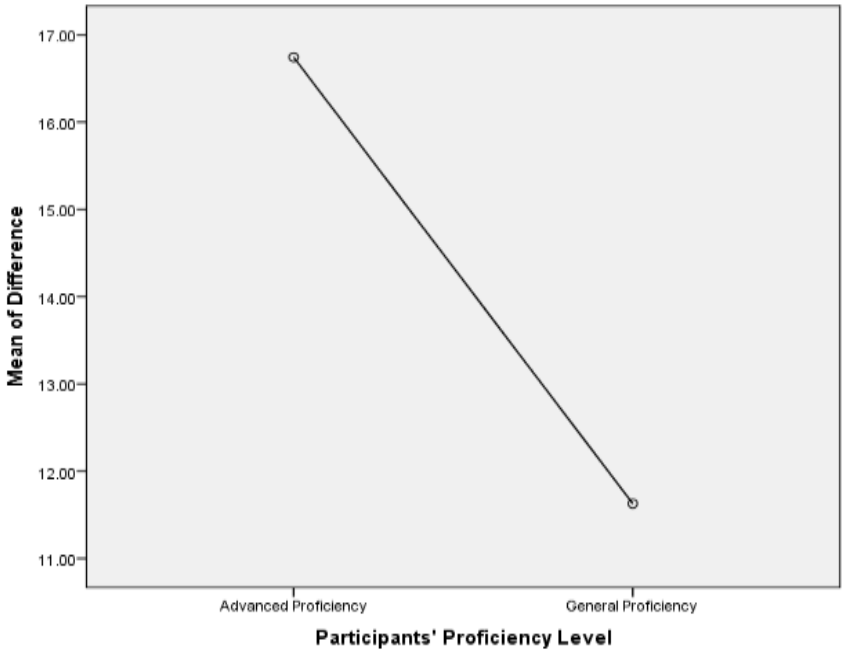

Figure 5. Means plot of the difference in mean scores for proficiency levels

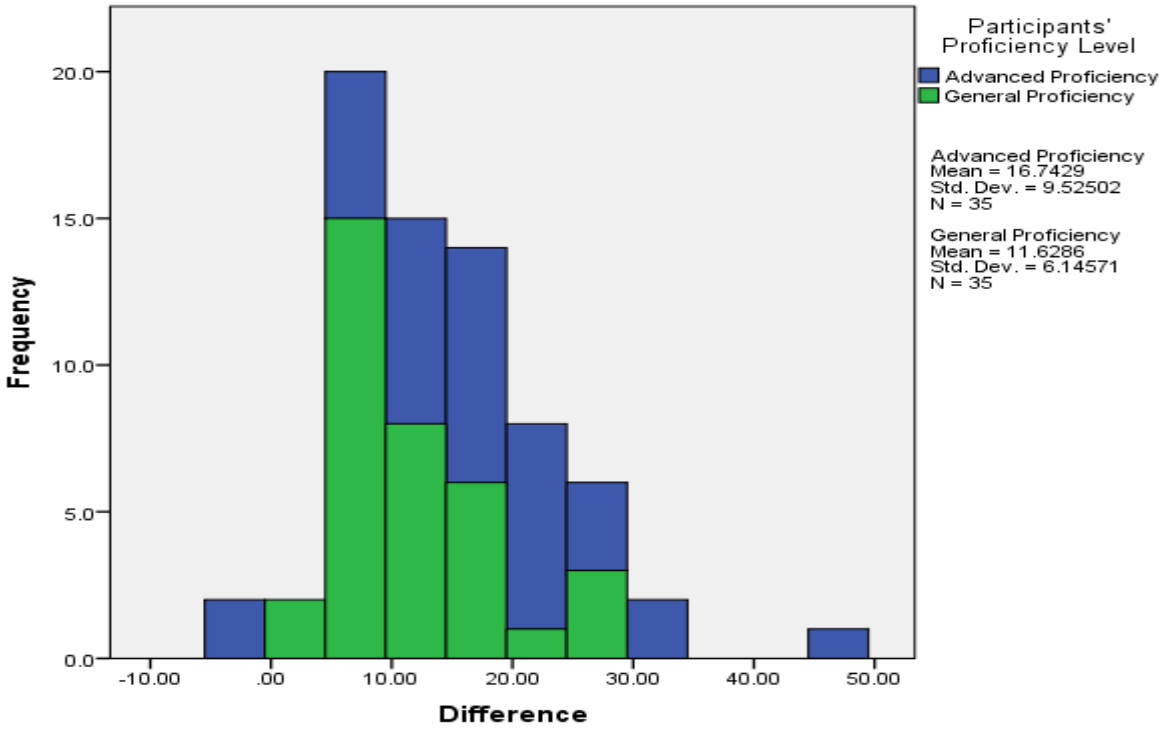

Figure 6. Histogram of the difference in mean across levels of proficiency

Overall, the means plot and histogram show a significant difference in pretest and post-test scores across proficiency levels. Learners in the advanced proficiency group (12Adv-DA) outperformed those in the general proficiency group (12Gen-DA) by approximately five points following the DA intervention. This improvement supports the conclusion that a statistically significant difference existed in grammar achievement gains between the two proficiency groups following the DA intervention.

4.5 Results for the Fourth Research Question

The qualitative research question was examined through a thematic analysis of transcripts from 20 audio-recorded interviews. This analytical process identified 13 core themes; each further elaborated through associated sub-themes. These included *participants' understanding of DA, experiences with DA interactions, their views on effective DA techniques, general positive attitudes towards DA, cognitive development through DA implementation, DA's role in addressing grammar weaknesses, challenges faced during DA implementation, perceived drawbacks, DA usefulness in specific grammar areas, preference for DA in exams, suggestions for curriculum integration,* and *recommendations for enhancing DA in EFL contexts*.

This section summarizes the key findings from the qualitative analysis, structured around the principal questions posed during the interviews.

The qualitative analysis explored learners' perceptions of DA and its effect on grammar achievement among EFL twelfth graders. None of the 20 participants had prior experience with DA, with one learner describing it as "a new way of learning," and many characterising it as "interactive," "collaborative," and "less stressful" than traditional NDA. Students highlighted DA's communicative nature, noting it helped them "engage with peers and teachers" and decreased test anxiety. Conversely, NDA was viewed as "rigid" and "anxiety-inducing." However, a few lower-level participants initially found DA challenging. In this context, one participant remarked that "it demands more English ability to participate effectively," indicating that its benefits might depend on learners' language skills.

Regarding whether they engaged in any interactional activities during the DA classes, most students reported being actively involved, often seeking support and feedback from both teachers and peers. One learner shared, "The teacher gave hints instead of direct answers, which improved my thinking." Another explained, "I helped classmates when they asked and sought the teacher's support when stuck." Interaction types varied, but collaborative discussions and teacher scaffolding were frequently praised.

In terms of the most significant DA techniques employed in the DA sessions, students also identified several DA strategies as effective. For instance, the general proficiency learners valued post-testing and guided explanations, with one noting, "The teacher's hints helped me learn things myself." However, advanced learners mostly preferred discussions and self-correction; one remarked, "When you find out what you did wrong on your own, it sticks in your head." Pretesting was seen as useful for identifying grammar weaknesses.

When questioned about their feelings during the DA intervention, the vast majority of learners expressed highly positive feelings toward DA. One participant said, "I was cheerful, calm, and not stressed at all," while another noted that DA made her feel "confident because I can seek help to learn, not just for marks." The classroom environment was also described as "supportive" and "full of positive energy,"

with some stating that DA even changed classmates' attitudes toward English.

Cognitively, DA was observed to improve critical thinking and problem-solving. "DA made me think of each question more carefully," explained one learner, while another stated that "the teacher's hints helped me think deeply." Although some students reported minimal impact, most believed that DA encouraged greater reflection and independent learning.

A further question sought to identify whether DA was useful in diagnosing and helping learners recognize their areas of weakness in grammar. In this regard, most participants mentioned that pretests and teacher feedback were particularly effective in this regard. One student said, "The pretest clearly showed me which grammar rules I kept getting wrong," and others valued class discussions and corrective feedback. However, some felt time was a constraint and expressed a desire for more sessions: "I wish we'd had more time to really master those challenging grammar points."

Participants were also asked if they had any difficulties during the DA intervention sessions. While most participants had no major challenges with implementing DA methods, a third reported early difficulties due to the novelty of DA or discomfort with group work. One explained, "DA was quite challenging for weak students at first… but they became more active." These initial issues typically diminished over time with support.

Furthermore, regarding the question of whether DA is practical and reliable for enhancing learners' grammar skills, it was found to be especially effective for complex grammar rules. For example, one advanced learner said, "The discussions finally made the conditional rules click," while a general-level student shared, "DA let me actively work through tenses with classmates." Learners also appreciated DA's immediate feedback and focused practice on difficult areas, such as modals and quantifiers.

Regarding participants' preferred assessment methods, all 20 preferred DA over NDA for future exams. "DA without thinking," said one, while another emphasized that DA "prepares us for college by developing skills like collaboration and self-correction." However, some suggested combining DA for regular assessments with NDA for finals to ensure both engagement and reliability.

Another question sought participants' recommendations and suggestions regarding the proposed change in language assessment. In this context, most learners recommended integrating DA into the English curriculum, proposing its use daily or weekly. One suggested using DA "at the beginning of each lesson to identify weaknesses." Another said, "It should be used in all subjects...we'll enjoy learning." Some also advocated for introducing DA from Grade One to build foundational skills early.

Finally, learners offered suggestions for improving DA, such as expanding it to other subjects and skills, increasing session time, and offering more support for struggling students. One advised, "DA should be used daily across the whole school," while another noted, "I do not see any need to improve this DA strategy as it is very useful as it is." Overall, most students viewed DA as a transformative approach that supports grammar development, critical thinking, and positive learning experiences.

5. Discussion

5.1 The Impact of Dynamic Assessment on Grammar Achievement

The first research question was whether interventionist Dynamic Assessment (DA) led to greater grammatical development than Non-Dynamic Assessment (NDA). The results indicated that the DA group achieved significantly higher gains than the NDA group, supporting the association between mediation-based assessment and grammatical development. This finding reflects a sociocultural interpretation of development rather than a purely instructional effectiveness outcome. In opposition to NDA, which implies a manifestation of fully developed development, what learners can perform independently, DA realizes the Zone of Proximal Development (ZPD) by placing responsiveness to mediation as the key analytic entity (Lantolf & Poehner, 2004; Poehner et al., 2018; Vygotsky, 1978).

The quality of DA means that the process of grammar acquisition is not only the issue of exposure to rules but also regulated intercourse. Graduated mediation appeared to support learners in externalising errors, negotiating meaning, and gradually internalising grammatical control. This is on the same note as Sternberg and Grigorenko (2002), who argue that the ability to learn is best realised under assisted conditions. The results, hence, confirm the theoretical statement that development is realized when assessment and instruction are not disaggregated.

5.2 The Effects of Dynamic Assessment Across Achievement Levels

The second research question examined the impact of DA on the grammar performance of low-, average-, and high-achieving learners. It was identified that the learners whose performance was low revealed the highest percentage improvement following the use of the DA intervention and consequently scored higher than the average- and high-achieving learners during the post-test.

This pattern is theoretically significant. In SCT, developmental capacity is poorly reflected in independent performance. Students at the lower end of the achievement range might still have significant latent potential within their ZPD. Graduated mediation may provide the regulatory scaffolding needed to activate this potential and bridge the gap between actual and potential development.

A related theory is the Cognitive Load Theory (Sweller, 1988). For low achievers, structured mediation can be offered to reduce extraneous cognitive load, with attention paid to the key grammatical elements to build the schema more efficiently. Moreover, the self-regulation and planning behavior can be enhanced by the dynamic feedback (Tzuriel et al., 2022), which should benefit the learners who never had a strategic focus before. On the other hand, high achievers will hit ceiling effects such that improvement in high achievers does not happen despite the presence of competence.

These findings suggest that DA may function as a regulatory support mechanism that helps reveal learners' developmental capacity, particularly among students with lower initial performance. The results are based on earlier research (Estaji & Ameri, 2020) and clearly differentiate between achievement and proficiency, indicating that performance level is an independent moderator of mediation responsiveness.

5.3 The Effects of Dynamic Assessment Across Proficiency Levels

The third research question was whether there was a difference in how DA influenced advanced and general proficiency learners. Although both groups benefited from mediation, the gains were greater among advanced learners.

This finding makes it hard to maintain the general belief that scaffolded methods work best with lower-proficiency learners. Proficiency reflects broader linguistic development and greater metalinguistic awareness. Higher-order learners can have more stable interlanguage systems and more strongly developed strategic ability and can therefore effectively internalize mediated feedback (Lantolf & Thorne, 2006). However, general proficiency learners might need more intensive scaffolding to cope with the complexity of a task.

The differing effects of achievement level and proficiency level reflect two distinct but interacting dimensions of learner development. Achievement level reflects current curriculum-based performance, whereas proficiency represents broader linguistic competence and metalinguistic development. Consequently, low-achieving learners may display larger observable gains because they begin with greater developmental gaps, while advanced proficiency learners may benefit more efficiently from mediated feedback due to stronger linguistic foundations. The results indicate that the effects of mediation are mediated by the interaction between these constructs. When performance is low, there is a visible gap in which progress can be made, whereas when performance is high, internalization is enhanced. Responsiveness to DA appears to be multidimensional rather than strictly linear.

Such results are consistent with those of Zhang and van Compernolle (2016), who found greater improvements among more advanced learners in a sandwich-type DA intervention and indicated that proficiency-sensitive calibration of interventionist DA could be necessary.

In order to avoid any apparent contradiction in these results, it is important to differentiate between the magnitude of gain and absolute performance. The low achievers showed the greatest average increase (20.08 points) due to greater developmental space in their ZPD. While scores increased numerically less for advanced proficiency learners as a group (16.74 points), this was because their higher baseline linguistic abilities led to higher absolute post-test scores, reflecting more efficient internalization of mediation. These patterns are theoretically consistent: DA fills the gap for learners who are struggling and challenges the advanced learners to ceiling performance.

5.4 Learners' Perceptions of Dynamic Assessment

The fourth research question explored learners' perceptions of DA and its influence on their grammar development. Qualitative findings indicated a strong preference for DA due to its interactive, supportive, and less anxiety-inducing format. Learners emphasized the value of teacher mediation, collaborative correction, and reflective dialogue.

These perceptions are consistent with recent findings linking DA to reduced foreign language anxiety and improved motivation (Ali & Abdulrazzaq, 2024; Ritonga et al., 2022). From a sociocultural standpoint, affect and cognition are interdependent; a supportive, mediated environment facilitates participation and risk-taking, which, in turn, promotes development.

However, a minority of lower-proficiency learners reported initial difficulty engaging with DA's interactive demands. This observation underscores a critical theoretical point: mediation must be calibrated to learners' regulatory readiness. If task demands exceed current capacity, mediation may impose additional cognitive burden rather than scaffold development. Effective DA, therefore, requires sensitivity to learners' developmental positioning within the instructional ecology.

5.5 Theoretical and Pedagogical Implications

Theoretically, the results support the sociocultural argument that development becomes practically observable under the mediated circumstances. By simulating both achievement and proficiency simultaneously, the research shows that the ZPD is not constant across learners but rather relational and moderated by prior performance and language consolidation. The results require more conceptualizations of mediation responsiveness to be multidimensional.

The pedagogical implications are that it is possible to incorporate graduated mediation into grammar education, especially when the underperforming students are taught independently, which can mask their hidden abilities. Nevertheless, there is a necessity for proficiency-sensitive task design. More analytically challenging mediation could be beneficial to more advanced learners, and more scaffolding density is likely to be necessary for learners with general proficiency. Large classroom settings may be a more realistic way to integrate the dynamic and static parts of the assessment model.

6. Conclusion

This study investigated the effects of interventionist Dynamic Assessment on grammar development among twelfth-grade EFL learners, modeling achievement and proficiency as moderating variables within a mixed-methods framework. The results demonstrate that Dynamic Assessment was associated with significantly greater grammatical gains than static assessment, and that responsiveness to mediation varied systematically across learner profiles.

Low-achieving learners exhibited the largest proportional gains, suggesting that DA may help activate unrealized potential within the ZPD. Advanced proficiency learners demonstrated stronger overall gains, indicating that linguistic consolidation may facilitate more efficient

internalization of mediated feedback. Qualitative evidence confirmed that learners perceived DA as supportive, interactive, and developmentally meaningful.

By integrating quantitative differentiation with qualitative insight, the study advances understanding of how structured mediation operates within heterogeneous classrooms. It moves beyond binary effectiveness claims and instead conceptualizes development as relational, moderated, and context sensitive.

6.1 Limitations and Future Directions

There are several limitations to consider. The quasi-experimental design used intact classrooms, limiting causal inference. Some confounding factors, like teacher differences, classroom interaction, and prior grammar instruction, could not be fully controlled. The internal consistency coefficients were restricted in some cohorts, possibly because the grammar evaluation was multidimensional when applied to different types of grammatical structures. Further studies should contribute to the improvement of the measurement instrument or to the use of item-level modeling methods. Another limitation of the study is that it was conducted in a single national setting and focused on short-term achievement gains; therefore, it could not be generalized.

To examine retention at the longitudinal level, future studies should investigate the effects of the mediation gains that need to be maintained. The differentiation of mediation by comparing interactionist and interventionist versions of DA models in grammar teaching would be explained by comparative studies. Microgenetic analysis of classroom interaction would also provide further explanations of how regulation is switched between other-mediated and self-mediated performance. There will be a need to extend research in linguistics and across various sociocultural backgrounds to refine the theoretical frameworks of dynamic assessment.

AI Disclosure Statement

During the preparation of this manuscript, the authors used Grammarly and DeepSeek for language refinement and readability support. These tools were not used for data analysis, interpretation of findings, reference generation, or scholarly decision-making. All content was critically reviewed and verified by the authors, who take full responsibility for the accuracy and integrity of the final manuscript.

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Author contributions

AAAK was responsible for the study design, theoretical framework development, and manuscript revision. EASA contributed to the study design, supervision of the research process, and critical revision of the manuscript. AMM was responsible for data collection, statistical analysis, drafting the manuscript, managing the revision process, and responding to reviewers' comments. All authors read and approved the final version of the manuscript and agreed to its submission for publication.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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