



This work is licensed
under a Creative
Commons Attribution
4.0 International
License.

Mobile-mediated dynamic assessment to enhance students' ESP writing skills

iD Lutfi Ashar Mauludin
Universitas Airlangga, Indonesia
lutfi.ashar@vokasi.unair.ac.id

iD Virgiawan Listanto
National Research and Innovation Agency, Indonesia
virgiawan.listanto@brin.go.id

iD Gatot Prasetyo
University of Montana, USA
gatot.prasetyo@umt.edu

The study aims to examine the effectiveness of mobile-mediated Dynamic Assessment using a WhatsApp group to improve student's writing skills in English for Specific Purposes classrooms. Furthermore, it also investigates the students' responses toward the mediating practices through the Dynamic Assessment activities. Thirty-one students of the English Diploma program in a public university in Indonesia participated in the study. The study employed a mixed-method explanatory sequential design. The data were gathered through pre-test, post-test, and observation of online records. A paired sample t-test and an independent sample t-test were utilized to find out the significance. The Reciprocity Framework was used to analyze the students' responses to the mediating practices. The results show that mobile-mediated Dynamic Assessment effectively enhances students' writing skills. Furthermore, the reciprocity analysis showed that the mediating process provides a convenient and less intimidating platform to respond to the teachers' feedback. Moreover, the activity provides a platform for students to collaboratively improve their mastery in composing writing.

Keywords: mobile-mediated language learning, dynamic assessment, ESP writing, literacy skills, vocational education

Introduction

The challenge in writing classes often stems from the limited time teachers have with students in the classroom. Students may also feel pressured when asked to compose or discuss their writing in a classroom setting where their peers are watching. Additionally, external factors such as limited classroom availability, adverse weather conditions, or pandemic-related restrictions frequently hinder in-person meetings, making it difficult to create a safe space for discussing writing progress. Recent technological advancements, however, have opened new opportunities for interaction between students and teachers beyond conventional classroom settings. Mobile-Assisted Language Learning (MALL), particularly through widely accessible platforms like WhatsApp, offers flexible and interactive environments, providing a safe space for students and accommodating more adaptable timelines.

Traditional methods of teaching writing in English as a Foreign Language (EFL) classrooms often rely on summative assessments and product-focused instruction. These approaches evaluate students based on their final written outputs, offering limited insights into their learning processes or potential for improvement. While these methods are effective for assessing proficiency at a fixed point, they often neglect opportunities to scaffold students' development through targeted interventions during the learning process. This limitation underscores the need for innovative approaches that integrate assessment with learning to enhance writing skills in dynamic and responsive ways.

English for Specific Purposes (ESP) writing instruction poses additional challenges. Unlike general English writing, ESP focuses on domain-specific communication needs in fields such as accounting, medicine, and business. It emphasizes the mastery of specialized language structures and lexicon relevant to specific professional or academic contexts, as outlined in tailored syllabi (Basturkmen, 2006; 2015). However, in Indonesia, many students enter ESP classrooms without a foundational knowledge of EFL, with some encountering English for the first time. As a result, instructors must often begin with the basics, which may resemble general EFL instruction, before transitioning to ESP-specific writing skills. This disconnect between learners' readiness and the demands of ESP highlights the need for approaches that support incremental skill development.

To address these challenges, Dynamic Assessment (DA) has emerged as a promising alternative. Rooted in sociocultural theory, DA integrates teaching and assessment, focusing on the learning process rather than solely on outcomes. It employs progressive guidance, such as hints and leading questions, to help learners exceed their current performance levels while capturing their responses to mediation as evidence of their learning potential (Ableeva, 2018; Lantolf & Poehner, 2011). Applications like WhatsApp have proven effective for facilitating real-time interaction and mediation during DA sessions, particularly in contexts requiring flexible and sustainable practices, such as during periods of social distancing (Ebadi & Bashir, 2021; Rassaei, 2020).

While the benefits of DA in traditional writing classrooms are well-documented (Alemi, 2015; Shrestha & Coffin, 2012), its application in mobile-mediated

contexts remains underexplored, especially for ESP writing. Moreover, prior research has largely overlooked learners' responsiveness to DA mediation, a critical component for understanding their capacity for growth and how mediation shapes their learning trajectories (Ableeva, 2018; Poehner, 2008; Poehner & Lantolf, 2005).

This study seeks to address these gaps by investigating the effectiveness of mobile-mediated DA, using WhatsApp groups, in improving ESP students' writing skills. Additionally, it examines students' responsiveness to mediation during DA sessions to gain a deeper understanding of their learning processes. The following research questions are addressed:

1. How effective is mobile-mediated DA in improving ESP students' writing skills?
2. What are the students' responses to the mediating practices in mobile-mediated DA?

Literature review

Mobile-mediated dynamic assessment. Within the broader field of Computer-Assisted Language Learning (CALL), Mobile-Assisted Language Learning (MALL) and Mobile Learning (M-learning) have emerged as significant research areas, driven by the proliferation of modern digital technologies, particularly in contexts emphasizing social and authentic learning experiences (Lin & Lin, 2019). MALL broadly defines learning activities that leverage telecommunication devices, including mobile phones, smartphones, personal digital assistants, and tablet computers (Hsu, 2013). Researchers highlight the distinctive benefits of these technologies, especially in informal and extracurricular learning environments (García Botero et al., 2019; Sung et al., 2016). A key advantage of MALL is its capacity to expand learners' opportunities for educational engagement beyond traditional classroom constraints, thereby substantially increasing potential learning time (Burston, 2015).

DA is a testing technique that modifies performance through mediation to identify the test taker's potential (Poehner et al., 2018). The primary purpose of this examination is to learn about the pupils' potential (Dörfler et al., 2009). Vygotsky's (1964) theory, which stressed the relevance of the Zone of Proximal Development (ZPD), has had a significant effect on the idea of DA. This notion refers to the disparity between an individual's perceived competence without assistance and their level of prospective growth with direction. DA utilizes the notion of ZPD, which implies that students are provided aid in measuring their accomplishments during the evaluation process. Hence, mobile-mediated DA is the integration of the DA approach in MALL.

The DA paradigm is established by integrating classroom instruction with assessment practice (Lantolf & Poehner, 2011; Poehner, 2018). In this situation, the instructor serves as a guide who actively supports students' growth while they complete the evaluation. There is no set model for implementing a DA. Teachers are able to interpret the strategy of assisting students based on their specific requirements. As a result, it is not a pre-specified technique of

assessment that can be followed consistently, but rather a rethinking of teaching, evaluation, and improvement. Components such as competency domain, test format, and student characteristics must be considered when constructing such evaluations (Dörfler et al., 2009).

The contrast between learning and development is critical in sociocultural theory and its expression in DA. While learning may be defined as the accumulation of information commonly reflected in higher standardized test scores, development can be defined as the transition from the social dimension to the individual dimension (Vygotsky, 1978). In other words, sociocultural theory views progress as a transition from relying on others to finish a task to independence and autonomous accomplishment. As a result, the theory stresses the observation of students' transitions from other-regulated to self-regulated behavior to understand growth better (Rassaei, 2021).

The primary distinction between dynamic and conventional assessments is that the former focuses on the learning experience and seeks to assist students' present skills to address difficulties that arise throughout the evaluation process. At the same time, the latter emphasizes accomplishment (Shrestha & Coffin, 2012). Unlike typical assessments which prioritize previously learned abilities and a product-oriented approach, DA does not evaluate results based on existing and product-oriented competencies (Sternberg & Grigorenko, 2002). Whereas traditional assessment prohibits any dialogue or interaction between examiner and examinee, DA views learners as active members and the examiners as a stimulant to offer them pleasant educational experiences. Importantly, DAs assign the examiner to provide comments throughout the evaluation process, whereas standard assessments exclude this practice. Mediation refers to the engagement of examiners throughout the testing procedure.

Mediation is crucial to DA since it helps identify students' skill improvement. Its goal is to draw attention to an issue that seems to be stimulating progress (Shakki et al., 2016). In other words, it necessitates dialogue between test administrators and test takers to overcome educational difficulties by employing clues, prompts, examples, or leading questions (Amiri & Saberi, 2016). This is not the same as a traditional evaluation, which considers intervention or mediation to be cheating or academic misconduct (Hessamy & Ghaderi, 2014).

Generally, mediation is classified into sandwich and cake mediation (Lantolf & Poehner, 2011; Poehner, 2008). The phases engaged in the sandwich format are pre-test, mediation, and post-test. The exercise begins with a pre-test to determine the learners' starting abilities. Following the pre-test activity, training is delivered as an intervention. Students are taught the most successful ways of answering exam questions. The exercise is followed by a post-test in which the parallel items indicate the range of performance students have as a result of the intervention and their particular learning abilities. Mediation can be done in a group or individually. Extensive mediation can be delivered in this fashion through multiple settings. The disadvantage of this format is that it is time-consuming because the pre-test and post-test activities are scheduled on separate days.

Unlike the sandwich procedure, the cake format involves intervention

during the assessment phase. Students who answer the tasks poorly receive a specific type of mediation during the exam. As a result, mediation is provided whenever an issue arises. Feedback, tips, or remarks can all be used to mediate. This format requires less time because there is considerable synergy between testing and mediation. As a result, the mediation provided should be simple and less complicated than the sandwich style. Specific tips, feedback, or prompts are made appropriate for each item to accommodate the restricted time.

The mediation process offers two ways: interventionist and interactionist (Poehner, 2008). In terms of method, the interventionist approach is deemed more conventional and regulated. When learners encounter challenges, pre-fabricated tips are provided. The attention is on the learning pace because the goal is to help learners answer problems quickly and efficiently. The interactionist method, on the other hand, focuses on the discourse between the examiner as a mediator and the learners. Mediation in this scenario aims to assess learners' progress and knowledge of the abilities necessary to solve the problems.

Technology-mediated DA offers several potential benefits. First, in big language classrooms with many students, face-to-face and one-to-one classroom DA may not be feasible (Teo, 2012). Furthermore, face-to-face classroom DA can only be applied in some educational situations where face-to-face interaction is possible, such as distance education and online language training programs. Some research has implemented DA mediated through various types of technology, such as computers (Poehner & Lantolf, 2013; Poehner et al., 2015; Teo, 2012). Teo (2012) reported the successful results of computerized mediation that did not entail face-to-face meetings to improve the students' reading comprehension. Poehner and Lantolf (2013) have described using computer software for the DA of foreign language learners' listening and reading comprehension. The program delivered progressively structured automatic mediation in response to the learners' errors. The authors provided several criteria for gauging learners' growth by examining their replies to computerized mediational cues. Furthermore, Poehner et al. (2015) provided an online multiple-choice assessment of reading and listening skills. The test incorporated implicit and explicit prompts to diagnose students' engagement in completing the tasks. The results showed that the scores provided a crucial diagnosis of students' language development.

As another form of technology, smartphones provide a critical platform for DA implementation because of their ubiquity and accessibility (Andujar, 2020). Several studies on MALL reported that smartphone use as mobile-mediated learning has shown significant results (Hsu, 2013; Kukulska-Hulme & Viberg, 2018; Xu & Peng, 2017). Students perceive positive attitudes toward mobile-mediated learning and experience reduced anxiety compared to computer-mediated learning (Hsu, 2013; Xu & Peng, 2017). Smartphones provide several benefits in collaborative mobile-mediated language learning, such as sustainability, flexibility, active participation, and time efficiency (Kukulska-Hulme & Viberg, 2018). More importantly, smartphones can help with language learning

by increasing learners' autonomy, knowledge creation, promoting learning outside of classroom environments, and providing possibilities for feedback.

The WhatsApp application, specifically, is an effective platform for assisting students' language learning (e.g., Arifani et al., 2020; Arifani & Jumadi, 2021; Awada, 2016; Rambe & Mkono, 2019). Students express positive attitudes about using WhatsApp as it is easily accessible (Arifani et al., 2020; Arifani & Jumadi, 2021). WhatsApp is considered to be effective in improving students' critical writing skills and enhancing their motivation (Awada, 2016). WhatsApp may provide a sense of autonomy, inspire learners, and stimulate interactions. Furthermore, WhatsApp-based supervisor/supervisee consultations and in-depth interviews promote social construction in a resource-constrained context (Rambe & Mkono, 2019).

On the other hand, a few studies have investigated the use of smartphones in DA implementations. Rezaee et al. (2019) found the efficiency of mobile-mediated DA in improving learners' speech correctness. Rassaei (2020) mentioned that learners who acquired gradual mediated cues to determine the meanings of unfamiliar words through mobile-mediated interactions outperformed learners who got ready-made explanations for the identical unknown terms. Rassaei (2021) also discovered that mobile-mediated DA significantly promoted students' awareness of request techniques. Furthermore, Ebadi and Bashir (2021) highlighted the advantages of smartphones in successfully implementing DA to measure and develop L2 writing talent.

Students' reciprocity in DA. Certain DA conditions are necessary to facilitate mediation: Intentionality, reciprocity, and transcendence (Mehrnoosh & Rassaei, 2015). Intentionality refers to a scenario in which the mediator directly communicates with the examinee by asking questions or providing cues. Reciprocity refers to the examinee's reactions to the mediators' assistance. This component concerns the examinee's ability to react to or respond to the mediator's commands. Conversely, transcendence broadens the partnership between the mediator, the examinee, and the mediator.

Learners' responses to mediation are an essential aspect of DA that should be included when measuring progress (Ableeva, 2018). Mediation transcendence implies that the mediator goes beyond the local task and pushes the learner to accomplish increasingly demanding and challenging tasks beyond the immediate context's needs (Rassaei, 2021). One frequent strategy used in prior DA research is measuring the amount of mediation learners require to accomplish a given task on an implicit-explicit scale and then establishing a degree of mediation that matches the student's ZPD. However, in addition to studying the mediation scale to measure learners' growth, learners' reactions to mediation might give important suggestions about learners' growing skills and should thus be studied (Ableeva, 2018; Levi & Poehner, 2018).

Learners' receptivity to mediation is referred to as 'learner reciprocity.' It encompasses a variety of language or even extra-linguistic responses and reactions to the mediation offered during a DA session. The mediator can estimate learners' prospective degree of growth by studying their reactions to mediation.

Learner reciprocity entails asking questions, discussing problems, and proposing alternatives beyond the correct/incorrect answer concept. It includes any form of learner's responses to mediation that reveal their engagement with the task during a collaborative activity (Poehner, 2008).

Learners' actions of reciprocity can be used to gauge their mastery over completing a task. In general, growth is measured under sociocultural theory as any small changes in learners' reciprocity during mediator-learner exchanges that demonstrate the learner gaining a more associative role throughout interaction (Aljaafreh & Lantolf, 1994). One conclusion of learner reciprocity analysis in DA is that development is a multilayered and multidimensional notion that cannot be grasped by evaluating learners' dichotomous answers to a series of activities. Learners' remarks on their shortcomings and mediation actions that demonstrate learners' cognitive comprehension of the language forms demonstrate learner reciprocity and should be included when measuring learners' growth (Poehner, 2018).

Methodology

The current study employs a mixed-method explanatory sequential design to achieve these goals. A quantitative technique is used first, followed by a qualitative approach to discuss the results (Creswell & Creswell, 2017). The quantitative technique follows a quasi-experimental design with no random sampling. The quantitative method is used to find out the effectiveness of mobile-mediated DA intervention during the learning process. Then, the qualitative approach was used to describe the interaction of DA and the students' reciprocity during the evaluation. A quasi-experimental design was selected because the participants were in an existing classroom where random sampling could not be implemented. The sampling was chosen based on convenient sampling.

Participants and the context

The participants of the study were 31 diploma students (3-year college program) majoring in English for Business Communication in a faculty of vocational studies in a public university in Indonesia. They were at a B-1 intermediate level of CEFR (Common European Framework of Reference for Languages) and ranged in age from 16 to 18. The participants consisted of 20 female and 11 male students who all learn EFL. Before enrolling at the university, they had learned English as a required subject in junior and senior high schools. Thus, they had studied English for about six years. However, since English is not an official or native language, students rarely use it in daily communication. To enroll in the English Diploma program, students should demonstrate at least intermediate speaking skills. They were assessed in an in-depth interview when applying to the program. They also had a Test of English as a Foreign Language test to determine their English proficiency before joining the program.

The students were freshmen in their first semester and enrolled in the Sentence-based Writing Class. The class met weekly for 50 minutes in the

theory sessions and 170 minutes in the practicum sessions. Since they were enrolled in vocational education, students were required to spend more time in the practicum session. The implementation of DA was primarily conducted in the practicum session. At this level, they learned how to compose in various genres, including descriptive, narrative, and expository paragraphs. The four-week study was divided into five stages: pre-test, mediation (group work), mediation (individual work), post-test, and data analysis. The sandwich format was employed in the study for group and individual work. The demographic data can be seen in Table 1.

Table 1. Demographic data of participants

Demographic characteristic	Details
Total participants	31 students
Program	Diploma in English for Business Communication
Educational level	3-year college program, Freshman (1st semester)
Age range	16–18 years old
Gender composition	20 females (64.5%), 11 males (35.5%)
Language proficiency	B-1 Intermediate (CEFR)
English learning background	6 years of English study (junior and senior high school)
Entry requirements	– Intermediate speaking skills – In-depth interview assessment – TOEFL-like proficiency test
Course details	– Sentence-based writing class – Weekly: 50 minutes theory, 170 minutes practicum

Design, data collection tools, and procedures

Since two groups were taught throughout the semester, one class was designated as the control group (16 students) and the other as the experimental group (15 students). The study was conducted in four weeks. The sandwich format was adopted in the experimental group for the DA method, with the mediation or intervention between the pre-test and post-test. The teacher explained the mediation to the students involved in the WhatsApp group mediation activity. The control group was given a typical teaching style without WhatsApp mediation activities. In the control group, the teacher gave students an explanation and had teachers' assistance without WhatsApp group mediation activity.

Students in the experimental group were invited to a WhatsApp group. The group was used to discuss the practicum activity, which involved composing a paragraph before it was submitted as a final product. Students completed the task and then submitted their work in the WhatsApp group. The final writing was submitted to the University Online Management Systems.

The procedures were divided into several stages. The pre-test was administered to the control and experimental groups in the first week. The students were assigned to write 12 sentences using basic sentence structures and

prepositional phrases. The students are studying sentence-based writing in the English for Business Communication program. Since they are freshmen, some of their English abilities are relatively basic. Thus, the topics in the course are sentences related to business activities, such as purchasing goods or going on vacation, etc. In some cases, the teacher tends to ignore the thematic content, as the main focus of the course is using subject, verb, and prepositional phrases. During the facilitation, the researchers did not intervene and let the interaction occur. Since the setting of the program is in an ESP context, the researchers decided to include this analysis to provide evidence on how sentence-based writing is taught in an ESP setting.

The test was given in the form of a short answer format in students' Learning Management System. The students were to finish the task within 60 minutes. The prompt was; "Write 10 sentences to portray business activities using subject, verb, object, and prepositional phrases." The students' writing was evaluated using the ESL Composition Profile (Jacobs et al., 1981). In this design, the teacher's role was the mediator in DA implementation. This stage was delivered in the first week. The activities were presented in table 2.

Table 2. Learning activities used during the course

Activities	Mediated-mobile dynamic assessment (experimental group)	Regular classroom tasks/activities (control group)
Building background	✓	✓
Modeling	✓	✓
Collaborative work (group discussion)	✓	✓
Individual work	✓	✓
Mediation in WA group	✓	-

In the second week, the basic sentence structures were explained to both groups. During this stage, the first learning activity was building background. The students learned types of basic sentence structures, grammatical features, and their functions. After that, the teachers provided examples and gave modeling sentences. In this stage, teachers demonstrated the steps on how to write sentences. This activity was delivered in the theory class. Then, in the practicum class, students were assigned to write sentences collaboratively in pairs. Some specific vocabulary was given, and their task was to compose sentences using different words and structures. Each word or phrase should be identified with subject (S), verb (V), object (O), or prepositional phrases (PP). The sentences were isolated and were not part of a coherent paragraph.

Teachers provided immediate feedback and mediation to the experimental group during the activity. Students submitted their group work; teachers immediately mediated by providing hints, prompts, or leading questions. The questions were presented to all the members of the groups. They were asked to analyze which sentences were incorrect and how to revise them. Students

might revise their work until the instructor approved it. This activity was only conducted in the experimental group.

In the third week, the second assessment was provided to both groups. At this point, the students composed sentences individually during the practicum session to assess their grasp of the material. This was also done to determine each student's weak points so that the teacher could effectively assist the student in improving them. The experimental group students submitted their work in the WhatsApp group, and then the teacher provided individual mediation. The activity was conducted simultaneously with the class activity as mediation, clues, prompts, recommendations, and leading questions were also supplied (see figure 1 and 2 for the samples of mediation).

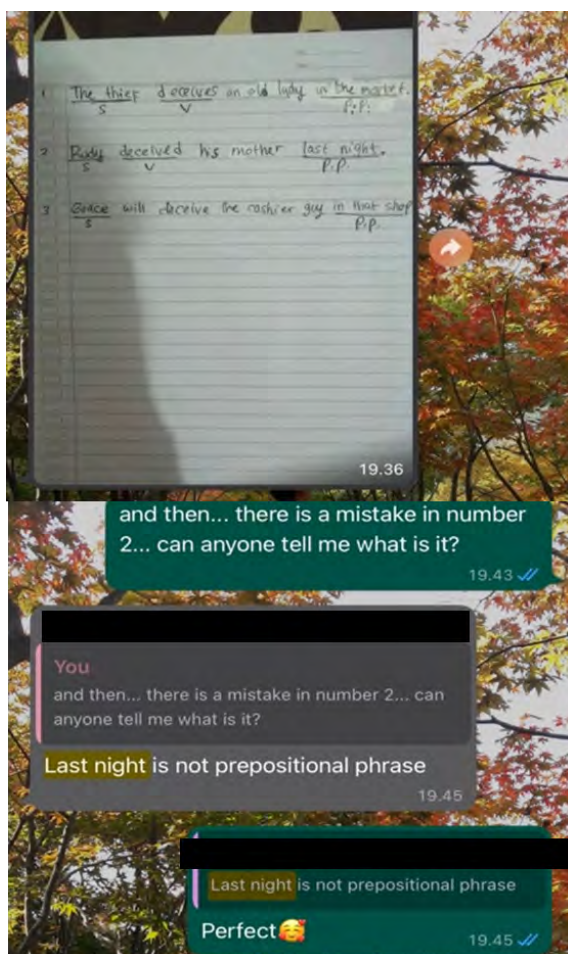


Figure 1. Sample of group mediation

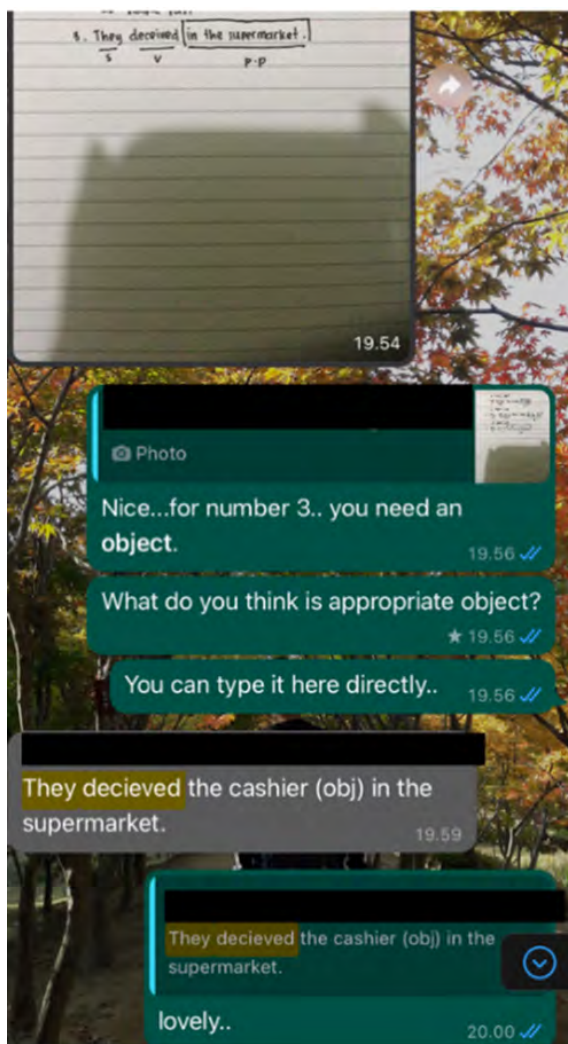


Figure 2. Sample of individual mediation

Post-tests were conducted for both experimental and control groups in the fourth week. The task was similar to the pre-test. The goal was to determine the participant's progress over the two-week activities.

Data analysis

This study employed a mixed-method explanatory sequential design for data analysis, facilitating a thorough evaluation of the efficacy of mobile-mediated Dynamic Assessment on students' ESP writing abilities. The investigation employed both quantitative and qualitative methodologies, guaranteeing a comprehensive evaluation of the data gathered from pre-tests, post-tests, and observations of online interactions within the WhatsApp group.

We utilized paired sample t-tests to assess the significance of the differences between pre-test and post-test scores for both the control and experimental groups in our analysis of the quantitative data. This statistical technique is

very effective for comparing two related samples, as it evaluates if the mean difference between paired observations is significantly distinct from zero. The outcomes were analyzed utilizing a standardized p -value, with a threshold of $p < 0.05$ indicating statistical significance. If the p -value is below 0.05, we may reject the null hypothesis and confirm that a significant difference in writing skills exists before and after the intervention.

Furthermore, independent sample t -tests were performed to compare the pre-test and post-test outcomes between the control and experimental groups. This analysis determines if the observed differences in writing skills can be ascribed to the mobile-mediated Dynamic Assessment intervention rather than extraneous factors. A p -value below 0.05 was employed as the threshold for significance.

To enhance data interpretation, we classified the mean scores (M scores) into several ranges indicative of different levels of writing proficiency. Scores below 60 may be categorized as “below average,” scores ranging from 60 to 75 as “average,” and scores beyond 75 as “above average.” This classification facilitates comprehension of overall performance trends and elucidates the intervention’s effects on various student groups. To prevent subjectivity, the students’ work was evaluated using the ESL Composition Profile (Jacobs et al., 1981) by two independent raters. The evaluation includes content, organization, vocabulary, language use, and mechanics.

To answer the second research question, online records of conversation (WhatsApp logs) in the WhatsApp group were observed and identified based on the reciprocity framework during interaction (Ableeva, 2018). Table 3 shows a reciprocity framework used to examine the mobile-mediated learner-teacher interactions during the DA sessions.

Table 3. Reciprocity framework during DA sessions (Ableeva, 2018)

1	Responsive vs. unresponsive
2	Incorporating mediator’s feedback
3	Providing a correct response to mediator’s feedback
4	Using other students’ writing as mediation in the absence of teacher’s mediation
5	Benefiting from mediation offered in response to other students’ incorrect writing

Findings

Descriptive statistics and classical assumption testing

The analysis of students’ scores in both the control and experimental groups utilized descriptive statistics to summarize the data characteristics. Table 4 presents the descriptive statistics for the pre- and post-test scores, highlighting significant insights into student performance. The experimental group, comprising 15 students, recorded a pre-test mean (M) score of 68.93 and a standard deviation (SD) of 10.29. The post-test mean score rose to 76.20, accompanied by

a notably reduced standard deviation of 4.00. This demonstrates a significant enhancement in writing abilities post-intervention. The control group, consisting of 16 students, exhibited a pre-test mean score of 71.62 ($SD = 9.68$) and a post-test mean score of 67.31 ($SD = 8.92$), indicating a decline in performance during the observed period.

Table 4. Descriptive statistics

Group	N	Minimum	Maximum	M	SD
Pre-test experimental group	15	50.00	86.50	68.93	10.29
Post-test experimental group	15	71.00	82.00	76.20	4.00
Pre-test control group	16	56.00	90.50	71.62	9.68
Post-test control group	16	51.50	86.50	67.31	8.92
Valid N (listwise)	15				

Classical assumption tests were conducted to ensure the validity of the inferential statistics used in this study. The initial step entailed evaluating the normality of the data, a fundamental assumption for performing paired sample t-tests and independent sample t-tests. Table 5 illustrates the application of the Kolmogorov-Smirnov and Shapiro-Wilk tests to assess the normality of the test scores. The significance values for these tests exceeded the alpha level of 0.05, suggesting that the data followed a normal distribution. This finding validates that the assumption of normality was satisfied for both groups.

Table 5. Tests of normality

Groups		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Test Scores	Pre-test experimental group	.120	15	.200*	.970	15	.864
	post-test experimental group	.186	15	.171	.900	15	.096
	Pre-test control group	.091	16	.200*	.974	16	.893
	Post-test control group	.119	16	.200*	.970	16	.844

*, This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Results of statistical analyses

An independent sample t-test was run to compare the mean percentage of students' scores in the pre-test of both groups. The results indicated no significant difference between the experimental ($M = 68.9$, $SD = 10.2$) and control ($M = 71.6$, $SD = 9.7$) groups. Table 6 below shows the mean results of both groups on the pre-test ($p > .05$). Thus, it can be claimed that the two groups were homogeneous in terms of their understanding of writing skills in English for specific purposes context prior to the main study.

Table 6. Independent samples test of pre-test data

Levene's Test for equality of variances		t-test for equality of means								
		F	p	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
									Lower	Upper
Students' score	Equal variances assumed	.135	.716	-.75	29	.459	-2.69	3.58	-10.02	4.64
	Equal variances not assumed			-.74	28.53	.460	-2.69	3.59	-10.04	4.66

The DA approach was given to the experimental group in the ESP writing class. The pre-test was administered before the intervention by assigning them to produce the sentences. Their writings were subsequently graded, and their results were calculated using paired sample statistics. Table 7 displays the tabulated data of paired sample statistics for the experimental (Pair 1) and control group (Pair 2) respectively. The post-test was administered following the intervention of DA. To address the first research question, a paired sample t-test was conducted to determine the intervention's significance. Table 7 shows that the Pair 1 (Experimental Group) Sig- t (.004) < α (.05). Hence, the intervention of DA was significantly effective in improving students' writing skills at a .05 level of significance. On the other hand, Pair 2 (Control Group) shows Sig- t (.153) > α (.05), which means that there were no significant mean differences in the student learning outcomes. An independent sample t-test was run to compare the means of students' scores in the post-test.

Following the intervention, an independent sample t-test was conducted to compare the post-test scores of the two groups following the intervention. The findings demonstrated a notable disparity between the experimental and control groups, with a significance value of $p = 0.02$, (< $\alpha = 0.05$), using equal variances not assumed as shown in Table 9. The decision was based on a Levene Statistic of 5.108 and a significance value (p value) of .032 (see Table 8). The p value of .032, being less than the conventional alpha level of .05, indicates a statistically significant difference in variances between the compared groups, as presented in Table 9. Consequently, we will reference the outcomes from the independent sample t-test that assumes equal variances are not assumed. Table 9 presents t-test results indicating a t-value of 3.615 and a significance value of .002 ($p < \alpha = .05$), thereby confirming a statistically significant difference in post-test scores between the experimental and control groups. This method ensures the validity of our analysis and adequately addresses the variance differences among the groups. Furthermore, the effect size was computed online with the Effect Size Calculator from <https://lbecker.uccs.edu/>. The result of Cohen's d ($d = 1.28$) and effect size ($r = .54$) show that the effect size was "large" (Maher et al., 2013). This suggests that the mobile-mediated DA had a significant positive effect on enhancing students' writing skills in the ESP context.

Table 7. Paired samples test

		Paired differences					t	df	Sig. (2-tailed)
		M	SD	Std. error mean	95% confidence interval of the difference				
					Lower	Upper			
Pair 1	Pre-test experimental group – Post-test experimental group	–7.26	8.21	2.12	–11.81	–2.71	–3.42	14	.004
Pair 2	Pre-test control group – Post- test control group	4.31	11.47	2.86	–1.80	10.42	1.50	15	.153

Table 8. Test of homogeneity of variance post-test data

	Levene Statistic	df1	df2	Sig.
Test scores based on mean	5.108	1	29	.032

Table 9. Independent samples test of post-test data

		t-test for equality of means								
									95% confidence interval of the difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Test scores	Equal variances assumed	5.108	.032	3.536	29	.001	8.88750	2.51343	3.74697	14.02803
	Equal variances not assumed			3.615	21.093	.002	8.88750	2.45831	3.77653	13.99847

Discussion

Mobile-mediated DA to improve students’ writing skills

The results support the previous findings, which emphasize the influence of DA in improving students’ writing skills (Alemi, 2015; Davoudi & Ataie-Tabar, 2015; Mauludin, 2018; Mauludin et al., 2021; Shrestha & Coffin, 2012). DA significantly impacts students’ writing skills because it stresses the process of mediation, which allows students to communicate and discuss a topic while writing (Amiri & Saberi, 2016; Shrestha & Coffin, 2012). The current study’s findings revealed that the experimental group outperformed the control group. This suggests that the interaction offered by the mediation helped the students

obtain accurate information to tackle the problem when writing a meaningful sentence. The most challenging aspect of writing in a foreign language is adjusting to the target language context. Due to the students' lack of expertise with the target language, the teacher should provide detailed information about it.

DA benefited students' growth of writing skills, particularly in improving their grammar and vocabulary (Davoudi & Ataie-Tabar, 2015; Mauludin, 2018; Mauludin et al., 2021). The t-test comparison between the control and experimental groups revealed that the DA significantly enhanced such skills. The DA mediation procedure was crucial in assisting students to overcome difficulties during the assessment activity. The direct feedback provided throughout the testing procedure assisted participants in more successfully overcoming the challenge. Furthermore, the different kinds of DA approaches used made a considerable contribution. The DA was performed in a group setting in the second stage. This allowed participants to receive additional assistance from their classmates (Davin & Donato, 2013). The peer plays a crucial part in learning as a source of knowledge about the target language (Mauludin, 2021). In a small group, peer help serves as conduct that aids in achieving higher levels. In this study, the teacher's support did not only target a few individuals, but it extended across the group, maximizing the function. In other words, in addition to instructor mediation, peer mediation boosted students' developing skills in sentence composition.

The results also indicate that the mobile-mediated DA significantly enhanced the students' skills. Similar to the previous studies (e.g., Rassaei, 2020; Rassaei, 2021), mobile-mediated DA encouraged learners to revise their mistakes immediately using the prompts provided. Mobile-mediated DA also enhanced students' written proficiency through collaborative work between students and their teachers using WhatsApp text mediation (Ebadi & Bashir, 2021). Mobile-mediated DA encourages participation and supports the ZPD-oriented interaction idea, emphasizing that collaborative work improves students' learning experience (Rezaee et al., 2019).

Regarding the control group, the post-test results show lower scores compared to the pre-test. Unlike the experimental group, where feedback was provided through synchronous mediation, the control group received feedback after the class ended. They received feedback in a traditional manner: completing the assignment, submitting it, and having the teacher review it, without the dynamic assessment process. Since they did not receive immediate intervention, it is possible that their lower scores are due to the delayed feedback they received. Some research has identified potential negative effects of delayed feedback on language learning. Studies have demonstrated that immediate feedback is generally more effective in enhancing learners' performance and retention compared to delayed feedback, especially in oral and written tasks. Delayed feedback was less effective in improving learners' understanding of grammatical structures, such as the English passive voice, compared to immediate feedback (Quinn & Nakata, 2017). Immediate feedback through dynamic assessment allowed learners to address errors more effectively during the learning process. Learners who received immediate feedback outperformed

those who received delayed feedback, highlighting the importance of timely correction for fostering linguistic accuracy and fluency (Arroyo & Yilmaz, 2018). The delayed feedback was less impactful compared to immediate feedback interventions, which offered real-time scaffolding during performance (Rezaee et al., 2019). These findings suggest that while delayed feedback has its place in language instruction, particularly for reflection and deeper processing, its effectiveness may be limited in contexts requiring the immediate application of corrections.

Students' responses to the mediating practices

To address the second research question, the online records from the WhatsApp group in the experimental class were observed. The students' responses to the teachers' mediating practices were highlighted and analyzed. The reciprocity criteria to examine the development within the students' ZPD during mobile-mediated DA were adapted from Ableeva (2018).

1. Responsive vs unresponsive. The student-mediator responses or reciprocity during DA are the signs of development (Ableeva, 2018). Whether correct or incorrect, students' responses indicate the willingness to interact with the mediator. Students' responses to the mediation showed that they attended to the mediator and found significant advantages in addressing the mediator (Rassaei, 2023). Figure 3 depicts how students' responsiveness to mediation stimulated further mediation.

Students' responsiveness was evident when the teachers asked to find several mistakes. One student immediately pointed it out. This shows the responsiveness to the prompts or hints provided by the teachers. The mediator mentioned 'mistakes' and asked students to figure out what kind of mistakes they were. Students' accuracy in addressing the questions showed the interactive mediation of being responsive. In this case, whether the student's response was correct or incorrect is not significant. The point is that the students immediately address the teacher's mediation by addressing the leading question.

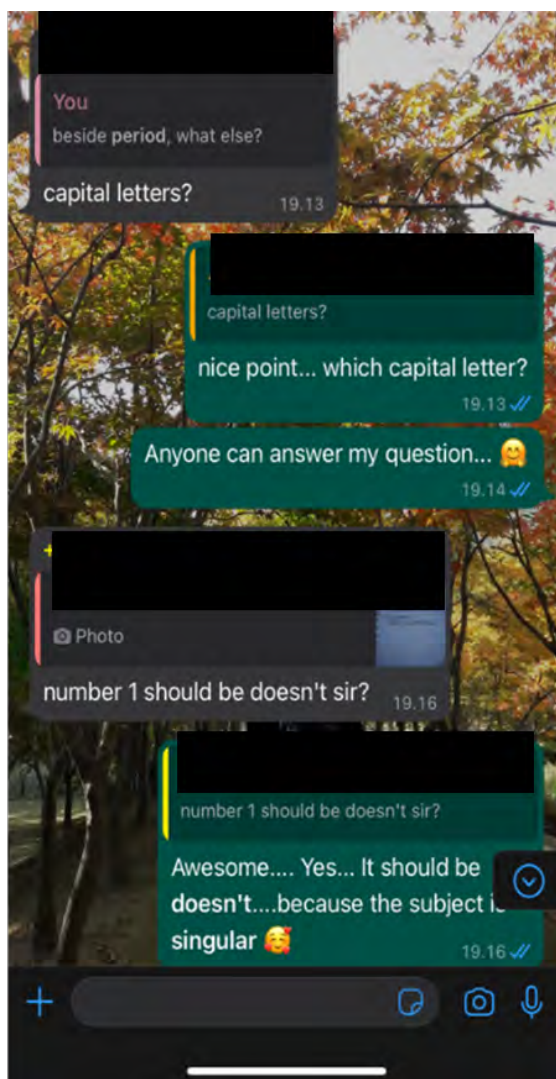


Figure 3. Sample of responsiveness

When the teachers noticed that only certain students responded to the questions, others were encouraged to respond. Their positive responses lead to further hints to analyze the mistakes in the following erroneous sentences. Their participation showed their willingness and motivation to address the issues. As mentioned in the previous studies, using WhatsApp as a mobile-mediated DA proved to cause less social pressure (Ebadi & Bashir, 2021). Interestingly, even though students let their work be shown to their peers and were collaboratively evaluated, they showed enthusiasm to submit their work and asked others to comment on it. Students gained confidence and felt motivated to increase their skills since the environment provided a comfortable experience. Thus, mobile-mediated DA is a tool that assists students in reaching their learning objectives since it allows mediation to solve problems via collaborative work with classmates and teachers (Mauludin et al., 2023).

2. Incorporating mediator's feedback. Incorporating the mediator's feedback refers to integrating the mediator's prompt into one's utterance so that the utterance is well-formed about the component of the learner's speech that attracted mediation. In other words, the students merge the mediator's prompts or leading questions to find the correct response. The following dialogue (see Figure 4) is an example of utilizing feedback from a mediator.



Figure 4. Sample of incorporating mediator's feedback

In the above interaction, the student changed the sentence three times. The mediator intended to fix the first sentence by adding the function of a verb so it has the correct form of “be” before the adjective “injured.” The student, however, perceived that the whole sentence was incorrect. He then suggested another form of sentence. In the second sentence, the mediator gave the prompt by clarifying what the verb is. The mediator intends to clarify whether students understand that the word “holiday” can be a verb or a noun. However, the

student suggested a different sentence for the third submission. This sentence is correct. The mediator's intention was met when the student incorporated the verb form into the adverb clause.

In this case, the students combined and merged two similar prompts to revise their work. Although the first hint was intended to fix the particular sentence, the student submitted a new one. In this case, the mediation failed to address the first sentence issue. However, this topic focuses on creating subject-verb agreement; thus, the mediator provides prompts to make sure the students understand the idea of subject-verb agreement. In the third attempt, he succeeded. Hence, the prompts provided by the mediator assisted the student's understanding of the subject-verb agreement. This interaction showed the convenience and efficiency of the WhatsApp group as a mobile-mediated DA platform (Ebadi & Bashir, 2021).

The data showed that addressing learners' errors in a DA manner is more beneficial than directly correcting learners' errors in a delayed manner, even if the latter was as helpful in promoting language learning growth in terms of the target forms. The examination of learners' reciprocity actions throughout the DA sessions revealed that as the sessions continued, the learners progressively exhibited more evidence of reciprocity and obtained more agentive responsibilities (Rassaei, 2021). The current study's findings imply that growth might manifest in minor changes in learners' receptivity to mediation.

3. Providing a correct response to mediator's feedback. This reciprocity was operationalized as fully formed and suitable statements in response to the mediator's cues or leading questions. The following dialogue (see Figure 5) demonstrates how this reciprocity metric was used in the current study. The students were instructed to write the sentence and analyze the structure.

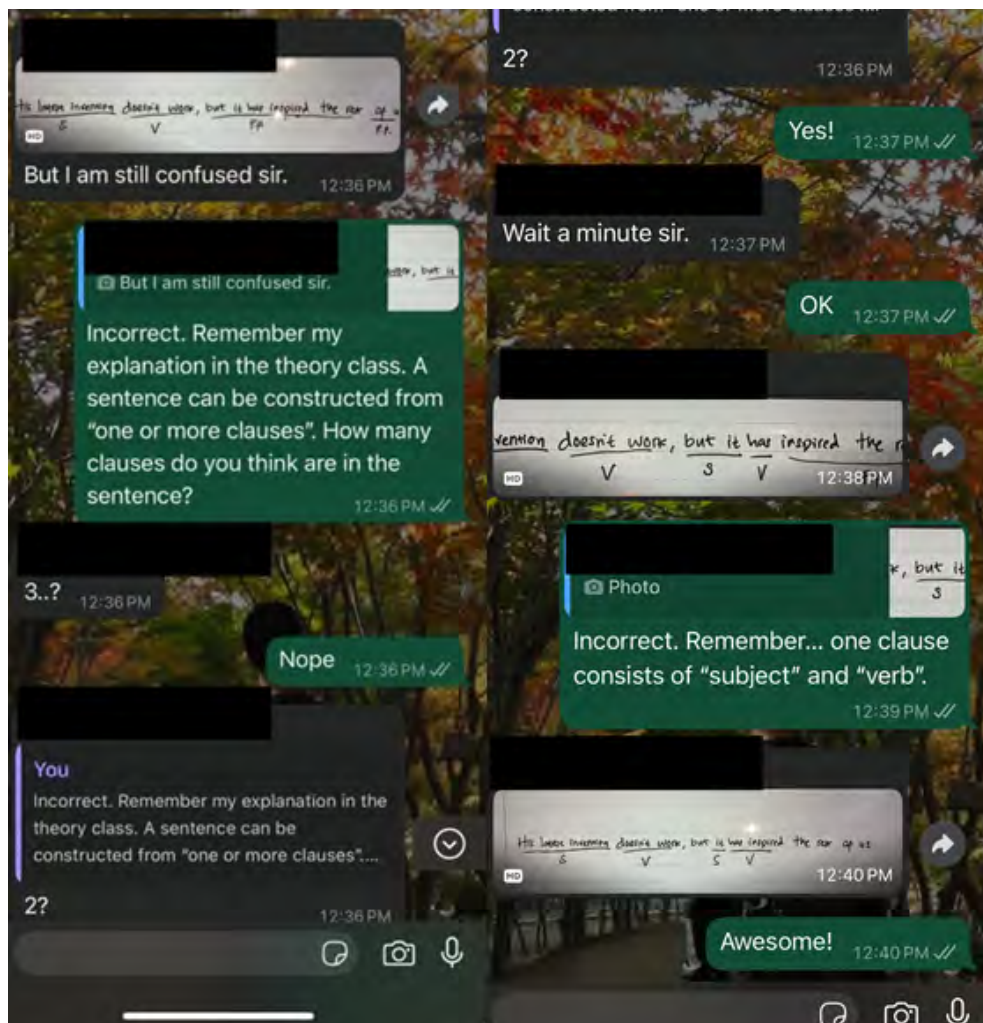


Figure 5. Sample of providing a correct response

There are two clues and two incorrect responses in the preceding chat. This shows that the number of accurate responses is comparable to the mediator's advice. The preceding exchange demonstrated how the student profited from the mediator's instructions as well as the statements of another student. The student initially analyzed the second clause incorrectly, assuming it was a prepositional phrase. By providing a leading question about how many clauses are available in the sentence, the mediator provides hints for the learner to focus on the number of clauses. The student benefited from that mediator's feedback when another student gave an incorrect response. She then found the correct number of clauses. She attempted to revise her work, but the analysis was still incorrect. She then tried again and succeeded after being given the second prompt. This exchange showed that the interactive and collaborative work in DA assisted students in identifying their weaknesses and diminished them (Ayuningtyas et al., 2022; Mauludin et al., 2021; Rassaei, 2021).

The results discussed above noted that as the DA sessions progressed, the

learners of the current study established a more agentic role by becoming more responsive to mediation and requiring less explicit mediation to correct themselves, as well as expressing better involvement with the mediator and other learners' contributions to the interactions. In sociocultural theory, agency is frequently defined as the ability of a group of persons rather than an individual to respond to mediation (Levi & Poehner, 2018). The reciprocity analyzed in this study may help measure learners' growth. These measurements give a more complete picture of learners' progress and learning capacity.

4. Using other students' writing as mediation in the absence of teacher's mediation. During the DA sessions, there were several occasions where students built on other learners' writing to enhance their own. During the individual activity, the teacher asked students to write adjective clauses. The students submitted their work in the WhatsApp group. The following example shows that the learners' attempts to write appropriately increased progressively, even without the instructor's mediation. This indicates that the students benefit not only from teacher mediation but also from peer mediation.

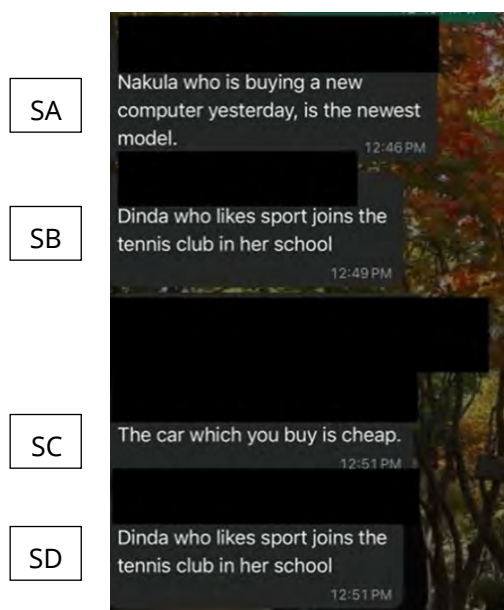


Figure 6. Sample of using other students' writing as mediation

In the above example (see Figure 6), four students wrote a sentence with an adjective clause in a particular order. The abbreviations SA, SB, and so on refer to Student A, Student B, and their respective counterparts. The letters A, B, C, and D are used to maintain student anonymity. SA produced an incorrect sentence by putting a comma before the verb 'is.' SB avoided using a comma but still made a mistake in the subject-verb agreement. The following two sentences successfully produced a sentence without 'comma' and 'subject-verb' agreement mistakes. This strengthens the idea that SA and SB's writing was a foundation for SC and SD's subsequent responses. The evidence highlights

students' ZPD condition in which peer mediation and guidance increase students' independent skills.

Furthermore, mobile-mediated DA offers an appropriate platform for group DA. Since traditional classrooms often target many students, social media on smartphones can facilitate students by dividing them into smaller groups. The mediator can observe and access the groups within a short amount of time (Andujar, 2020; Rassaei, 2021). Thus, the present study suggested the possibility of smartphones as a platform for implementing group DA.

5. Benefiting from mediation offered in response to other students' incorrect writing. In this part, during the DA sessions, students benefited from the mediation hints or leading questions suggested to other students to compose a well-written sentence.

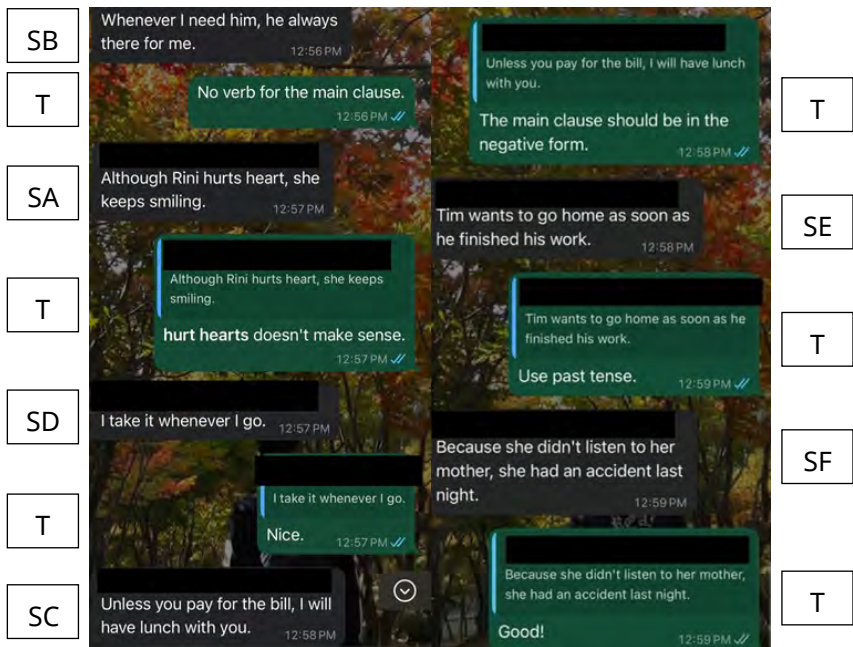


Figure 7. Sample of benefiting from mediation

The above examples (see Figure 7) show that the mediator provided four hints and prompts. T refers to the teacher or mediator. The abbreviations SA, SB, and so on refer to Student A, Student B, and their respective counterparts. The letters A, B, C, D, E and F are used to maintain student anonymity. The teacher addressed SB's sentence in the first one, which has no 'verb.' In the following sentence, though the sentence still contains errors, it has a 'verb.' This shows that the previous prompts give beneficial information to the next student. The second prompt provided illogical meaning information. The following sentence showed the logical meaning, which raised the possibility of successful prompts. Then, the mediator addressed SF's mistake of using the present word 'want' instead of 'went' by mentioning the "past tense." The following student, however, responded by providing an error-free simple past

sentence. This highlighted that the mobile-mediated DA provided collaborative mediation that benefited all the group members.

Compared to more traditional DA, learners in mobile-mediated group DA gain from their mediator, which can be a person or a computer, and other students' responses. Peers' mediation acts as additional mediation. The DA examples described above clearly show that throughout the mobile-mediated DA sessions, the learners refined their replies to finish the assignment by building on each other's efforts and the mediation cues offered in response to such efforts (Ebadi & Bashir, 2021; Rassaei, 2021). DA successfully recognized and responded to students' particular requirements (Shrestha & Coffin, 2012). The synchronous mediation using progressive written commentary is an effective mediation technique for instructors to help L2 learners improve their writing skills (Kushki et al., 2022).

Based on the statistical analysis and the reciprocity observation, mobile-mediated DA offers significant and essential roles in assisting students in mastering English skills. These advantages encompass the support of distance learning and the ease of access. Mobile-mediated DA provides learning opportunities to interact and engage outside the traditional classroom. The WhatsApp group provides a sociocultural interaction that supports collaboration and interaction. The examples provided from the mobile-mediated DA intervention depicted that students benefit significantly from the mediation hints and leading questions offered by the mediator during the activities.

Several key points are worth noting. Firstly, interaction within the WhatsApp group was comfortable and less intimidating, with students actively engaging with the mediator's prompts. The collaboration between learners and instructors facilitated improvements in writing proficiency, with mediation in DA proving to be efficient, convenient, and reducing social pressure (Ebadi & Bashir, 2021; Mauludin et al., 2021; Nagaletchimee, 2015). This process encouraged students to reflect on their weaknesses, which could be addressed during the guidance phase (Amiri & Saberi, 2016). Understanding learners' potential allows for more effective teaching that helps overcome learning challenges. Additionally, the mediation reduced anxiety, motivating students to complete their writing tasks (Ayuningtyas et al., 2022; Mauludin & Prasetyo, 2024). The students' active participation and willingness to provide peer feedback in real time reflected their motivation and initiative in the process assessment. The online synchronous environment helped students explore their abilities in a safe space, fostering a sense of autonomy.

Secondly, directly addressing students' errors proved more effective, as learners were more responsive to their mistakes and eager to correct them. DA effectively enhanced students' understanding of writing structures (Alemi, 2015). Many students struggled with text organization, and the instructor's ongoing feedback helped bridge this gap. The practice of self-evaluation enabled students to assess their writing abilities and improve their self-assessment accuracy, especially for lower-level learners. This process allowed for a better alignment between teacher and student evaluations, enhancing students' skills over time. Learners also became more responsive to mediation, which helped

them develop a more active role in their learning (Rassaei, 2023). Mobile-mediated DA supports a student-centered, technology-enhanced approach that fosters constructive learning (Tsai & Tsai, 2019; Xue & Churchill, 2020).

Lastly, mobile-mediated DA sessions encouraged students to take a more agentive role, requiring fewer explicit prompts to correct themselves. The interactive nature of mobile platforms, such as WhatsApp, allows students to engage in synchronous communication, exchanging feedback and comments. This dynamic interaction proves effective for implementing DA, as it provides learners with ample time to focus on language features. Text-based interactions in particular, have been shown to promote greater attention to form and more accurate language production compared to oral communication (Kim, 2017; Ortega, 2009; Winans, 2020). The continuous intervention from the mediator helps students gradually improve their understanding, with the mediator's role becoming less necessary as students progress (Fakher Ajabshir, 2020). Thus, mobile-mediated DA is effective in enhancing the development of targeted language skills (Andujar, 2022; Ebadi & Bashir, 2021; Rassaei, 2024).

Conclusion

This study has revealed that the mobile-mediated DA effectively improves the students' writing skills in an ESP classroom. More specifically, the students' responses during the activities showed several advantages. First, the interaction in the WhatsApp group was convenient and less intimidating as the students actively responded to the mediator's prompts. Secondly, directly addressing students' mistakes revealed more effective results since students show more reciprocity to their mistakes and willingness to correct their mistakes. Then, during mobile-mediated DA sessions, students show a more agentive role by being more responsive to mediation and needing fewer explicit prompts to correct themselves.

Moreover, mobile-mediated DA provides a group DA where students can learn from other mistakes and provide peer mediation. The collaborative work significantly improves their mastery in composing better sentences. Finally, mobile-mediated DA provides direct feedback from human mediators, not machines, which is direct and flexible. This provides a platform for the students to get immediate feedback.

The present study offers some implications for language teachers regarding the benefits of mobile phone and WhatsApp applications for ESP instruction. Firstly, mobile-mediated DA can be utilized to perform writing activities and assessments. Secondly, in the DA application, teachers as mediators are suggested to consider and evaluate several reciprocity moves to measure students' development and assessment. Regarding process assessment, teachers may use the students' reciprocity as evidence of students' developing and progressive skills.

Furthermore, several limitations should be highlighted. The data for the statistical analysis was limited since it only involved a pre-test and post-test. The scores were also taken only from four weeks of activity. Hence, more variables

and more prolonged duration should be implemented in further research. Then, although the present study revealed a positive contribution of DA, it only covered one writing topic in four weeks. Since students' performance is unpredictable, different writing topics should be provided. Finally, the current study provided a lack of analysis of individual responses due to space limitations. Further research discussing the more detailed evidence of individual responses toward mobile-mediated DA may provide better insights into the students' perception of this approach.

References

- Alemi, M. (2015). The impact of dynamic assessment on Iranian EFL students' writing self-assessment. *Teaching English Language*, 9(1), 145–169. <https://doi.org/10.22132/tel.2015.53735>
- Aljaafreh, A., & Lantolf, J. P. (1994). Negative feedback as regulation and second language learning in the zone of proximal development. *Modern Language Journal*, 78(4), 465–483. <https://doi.org/10.2307/328585>
- Amiri, F., & Saberi, L. (2016). Dynamic assessment: The effect of mediated learning experience on Iranian EFL learners' writing skills. *International Academic Journal of Humanities*, 3(2), 1–9.
- Andujar, A. (2020). Mobile-mediated dynamic assessment: A new perspective for second language development. *ReCALL*, 32(2), 178–194. <https://doi.org/10.1017/S0958344019000247>
- Arifani, Y., & Jumadi. (2021). Enhancing EAP learners' academic vocabulary learning: An investigation of Whatsapp-based reporting and receiving activities. *Teaching English with Technology*, 21(4), 51–75.
- Arifani, Y., Asari, S., Anwar, K., & Budianto, L. (2020). Individual or collaborative WhatsApp learning? A flipped classroom model of EFL writing instruction. *Teaching English with Technology*, 20(1), 122–139.
- Arroyo, D. C., & Yilmaz, Y. (2018). An open for replication study: The role of feedback timing in synchronous computer-mediated communication. *Language Learning*, 68(4), 942–972. <https://doi.org/10.1111/lang.12300>
- Awada, G. (2016). Effect of WhatsApp on critique writing proficiency and perceptions toward learning. *Cogent Education*, 3(1), 1–25. <https://doi.org/10.1080/2331186X.2016.1264173>
- Ayuningtyas, P., Mauludin, L. A., & Prasetyo, G. (2022). Investigating the anxiety factors among English for specific purposes students in a vocational education setting. *Language Related Research*, 13(3), 31–54. <https://doi.org/10.29252/LRR.13.3.2>
- Basturkmen, H. (2006). *Ideas and options in English for Specific Purposes*. New York: Routledge
- Basturkmen, H. (2015). *Developing courses in English for Specific Purposes*. London: Palgrave Macmillan.
- Burston, J. (2015). Twenty years of MALL project implementation: A meta-analysis of learning outcomes. *ReCALL*, 27(1), 4–20. <https://doi.org/10.1017/S0958344014000159>

- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. London: Sage publications.
- Davin, K. J., & Donato, R. (2013). Student collaboration and teacher-directed classroom dynamic assessment: A complementary pairing. *Foreign Language Annals*, 46(1), 5–22. <http://dx.doi.org/10.1111/flan.12012>
- Davoudi, M., & Ataie-Tabar, M. (2015). The effect of computerized dynamic assessment of L2 writing on Iranian EFL learners' writing development. *International Journal of Linguistics and Communication*, 3(2), 176–186. <https://doi.org/10.15640/ijlc.v3n2a16>
- Dörfler, T., Golke, S., & Artelt, C. (2009). Dynamic assessment and its potential for the assessment of reading competence. *Studies in Educational Evaluation*, 35(2–3), 77–82. <https://doi.org/10.1016/j.stueduc.2009.10.005>
- Ebadi, S., & Bashir, S. (2021). An exploration into EFL learners' writing skills via mobile-based dynamic assessment. *Education and Information Technologies*, 26(2), 1995–2016. <https://doi.org/10.1007/s10639-020-10348-4>
- Fakher Ajabshir, Z. (2020). The relative efficacy of input enhancement, input flooding, and output-based instructional approaches in the acquisition of L2 request modifiers. *Language Teaching Research*, 26(3), 411–433. <https://doi.org/10.1177/1362168819896655>
- García Botero, G., Questier, F., & Zhu, C. (2019). Self-directed language learning in a mobile-assisted, out-of class context: Do students walk the talk? *Computer Assisted Language Learning*, 32(1–2), 71–97. <https://doi.org/10.1080/09588221.2018.1485707>.
- Hessamy, G., & Ghaderi, E. (2014). The role of dynamic assessment in the vocabulary learning of Iranian EFL learners. *Procedia – Social and Behavioral Sciences*, 98, 645–652. <https://doi.org/10.1016/j.sbspro.2014.03.463>
- Hsu, L. (2013). English as a foreign language learners' perception of mobile assisted language learning: A cross-national study. *Computer Assisted Language Learning*, 26(3), 197–213. <https://doi.org/10.1080/09588221.2011.649485>
- Jacobs, H. L., S. A. Zingraf, D. R. Wormuth, V. F. Hartfiel, and J. B. Hughey. (1981). *Testing ESL composition: A practical approach*. Rowley: Newbury House.
- Kim, H. Y. (2017). Effect of modality and task type on interlanguage variation. *ReCALL*, 29(2), 219–236. <https://doi.org/10.1017/S0958344017000015>
- Kukulka-Hulme, A., & Viberg, O. (2018). Mobile collaborative language learning: State of the art. *British Journal of Educational Technology*, 49(2), 207–218. <https://doi.org/10.1111/bjet.12580>
- Kushki, A., Rahimi, M., & Davin, K. J. (2022). Dynamic assessment of argumentative writing: Mediating task response. *Assessing Writing*, 52, 100606. <https://doi.org/10.1016/j.asw.2022.100606>
- Lantolf, J. P., & Poehner, M. E. (2011). Dynamic assessment in the classroom: Vygotskian praxis for second language development. *Language Teaching Research*, 15(1), 11–33. <https://doi.org/10.1177/1362168810383328>

- Levi, T., & Poehner, M. E. (2018). Employing dynamic assessment to enhance agency among L2 learners. In *The Routledge handbook of sociocultural theory and second language development* (pp. 295–309). New York: Routledge.
- Lin, J. J., & Lin, H. (2019). Mobile-assisted ESL/EFL vocabulary learning: A systematic review and metaanalysis. *Computer Assisted Language Learning*, 32(8), 878–919. <https://doi.org/10.1080/09588221.2018.1541359>.
- Maher, J. M., Markey, J. C., & Ebert-May, D. (2013). The other half of the story: effect size analysis in quantitative research. *CBE – Life Sciences Education*, 12(3), 345–351.
- Mauludin, L. A. (2018). Dynamic assessment to improve students' summary writing skill in an ESP class. *Southern African Linguistics and Applied Language Studies*, 36(4), 355–364. <https://doi.org/10.2989/16073614.2018.1548296>
- Mauludin, L. A. (2021). Students' perceptions of the most and the least motivating teaching strategies in ESP classes. *Iranian Journal of Language Teaching Research*, 9(1), 139–157. <https://doi.org/10.30466/ijltr.2021.120980>
- Mauludin, L. A., Ardianti, T. M., Prasetyo, G., Sefrina, L. R., & Astuti, A. P. (2021). Enhancing students' genre writing skills in an english for specific purposes class: A dynamic assessment approach. *Mextesol Journal*, 45(3), 1–12. <https://doi.org/10.61871/mj.v45n3-13>
- Mauludin, L. A., Sefrina, L. R., Ardianti, T. M., Prasetyo, G., Prassettyo, S., & Putri, C. I. (2023). An investigation of the students' perceptions of motivating teaching strategies in English for specific purposes classes. *Journal of University Teaching & Learning Practice*, 20(6). <https://doi.org/10.53761/1.20.6.5>
- Mauludin, L.A., & Prasetyo, G. (2024). Vocational students' perception of motivational teaching strategies in English for specific purposes online classes. *Mextesol Journal*, 48(1), 1–13. <https://doi.org/10.61871/mj.v48n1-12>
- Mehrnoosh, L., & Rassaei, E. (2015). Dynamic assessment: From underlying constructs to implications for language teaching. *Journal of Studies in Learning and Teaching English*, 4(2), 119–132. http://jslte.iaushiraz.ac.ir/?_action=xml&article=529356
- Nagaletchimee, A. (2015). Using WhatsApp to extend learning. *Teaching English with Technology*, 19(1), 3–20.
- Ortega, L. (2009). Interaction and attention to form in L2 text-based computer-mediated communication. In: Mackey, A., Polio, C. (eds.) *Multiple Perspectives on Interaction*, pp. 226–253. New York: Routledge.
- Poehner, M. E., & Lantolf, J. P. (2005). Dynamic assessment in the language classroom. *Language Teaching Research*, 9(3), 233–265. <https://doi.org/10.1191/1362168805lr1660a>
- Poehner, M. E. (2008). *A Vygotskian approach to understanding and promoting L2 development library of congress control*. New York: Springer

- Poehner, M. E., & Lantolf, J. P. (2013). Bringing the ZPD into the equation: Capturing L2 development during computerized dynamic assessment (C-DA). *Language Teaching Research*, 17(3), 323–342.
<https://doi.org/10.1177/1362168813482935>
- Poehner, M. E., Zhang, J., & Lu, X. (2015). Computerized dynamic assessment (C-DA): Diagnosing L2 development according to learner responsiveness to mediation. *Language Testing*, 32(3), 337–357.
<https://doi.org/10.1177/0265532214560390>
- Poehner, M. E., Kinginger, C., van Compernelle, R. A., & Lantolf, J. P. (2018). Pursuing Vygotsky's dialectical approach to pedagogy and development: A response to Kellogg. *Applied Linguistics*, 39(3), 429–433.
<https://doi.org/10.1093/applin/amx033>
- Quinn, P., & Nakata, T. (2017). The timing of oral corrective feedback. In H. Nassaji & E. Kartchava (Eds.), *Corrective feedback in second language teaching and learning* (pp. 51–64). New York: Routledge.
- Rambe, P., & Mkono, M. (2019). Appropriating WhatsApp-mediated postgraduate supervision to negotiate “relational authenticity” in resource-constrained environments. *British Journal of Educational Technology*, 50(2), 702–734. <https://doi.org/10.1111/bjet.12688>
- Rassaei, E. (2020). Effects of mobile-mediated dynamic and nondynamic glosses on L2 vocabulary learning: A sociocultural perspective. *Modern Language Journal*, 104(1), 284–303. <https://doi.org/10.1111/modl.12629>
- Rassaei, E. (2021). Implementing mobile-mediated dynamic assessment for teaching request forms to EFL learners. *Computer Assisted Language Learning*, 36(3), 257–287. <https://doi.org/10.1080/09588221.2021.1912105>
- Rassaei, E. (2023). The effects of text-based and audio-based dynamic glosses on L2 vocabulary learning: A dynamic assessment approach. *The Language Learning Journal*, 51(4), 509–522.
<https://doi.org/10.1080/09571736.2023.2213247>
- Rassaei, E. (2024). Enhancing EFL learners' knowledge of L2 requests during mobile-mediated text-based and audio-based dynamic assessment. In *International Conference on Blended Learning* (pp. 251–261). Singapore: Springer Nature.
- Rezaee, A. A., Alavi, S. M., & Razzaghifard, P. (2019). The impact of mobile-based dynamic assessment on improving EFL oral accuracy. *Education and Information Technologies*, 24(5), 3091–3105.
<https://doi.org/10.1007/s10639-019-09915-1>
- Shakki, F., Derakhshan, A., & Ziabari, R. S. (2016). The interplay between language skills and dynamic assessment. *International Journal of Linguistics*, 8(2), 141–157. <https://doi.org/10.5296/ijl.v8i2.9221>
- Shrestha, P., & Coffin, C. (2012). Dynamic assessment, tutor mediation and academic writing development. *Assessing Writing*, 17(1), 55–70.
<https://doi.org/10.1016/j.asw.2011.11.003>
- Sternberg, R. J., & Grigorenko, E. L. (2002). *Dynamic testing: The nature and measurement of learning potential*. Cambridge: Cambridge University Press

- Sung, Y. T., Chang, K. E., & Liu, T. C. (2016). The effects of integrating mobile devices with teaching and learning on Students' learning performance: A meta-analysis and research synthesis. *Computers & Education*, 94, 252–275. <https://doi.org/10.1016/j.compedu.2015.11.008>.
- Teo, A. (2012). Promoting EFL students' inferential reading skills through computerized dynamic assessment. *Language Learning and Technology*, 16(3), 10–20. <http://dx.doi.org/10125/44292>
- Tsai, P.-S., & Tsai, C.-C. (2019). Preservice teachers' conceptions of teaching using mobile devices and the quality of technology integration in lesson plans. *British Journal of Educational Technology*, 50(2), 614–625. <https://doi.org/10.1111/bjet.12613>
- Vygotsky, L. S. (1964). Thought and language. *Philosophy of Science*, 31(2), 190–191.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.
- Winans, M. D. (2020). Email requests: Politeness evaluations by instructors from diverse language backgrounds. *Language Learning & Technology*, 24(2), 104–118. <http://hdl.handle.net/10125/44728>
- Xu, Q., & Peng, H. (2017). Investigating mobile-assisted oral feedback in teaching Chinese as a second language. *Computer Assisted Language Learning*, 30(3–4), 173–182. <https://doi.org/10.1080/09588221.2017.1297836>
- Xue, S., & Churchill, D. (2022). Educational affordances of mobile social media for language teaching and learning: A Chinese teacher's perspective. *Computer Assisted Language Learning*, 35(4), 918–947. <https://doi:10.1080/09588221.2020.1765811>