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A Comparative Study of Duolingo and Traditional Classroom Instruction in Enhancing English Language Proficiency

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ABSTRACT

The recent surge in Mobile-Assisted Language Learning (MALL) has raised significant concerns about the efficacy of digital applications as opposed to traditional classroom-based learning as far as improving English proficiency is concerned. This research used a quasi-experimental pre-test/post-test control-group design with a sample of 60 undergraduate students (B1-B1+) in two groups, a Duolingo and a traditional instruction group, during an eight-week experiment. A standardized proficiency test that covered vocabulary, grammar, reading and listening, and a questionnaire that was used to determine how learners perceived it were used to gather data. Descriptive statistics, paired samples t-tests, independent samples t-tests, and Cohen d were used to analyze the data. The results indicated that the general proficiency increased significantly both groups ($p < .001$) and the effects were substantial ($d = 1.73$ in the Duolingo group; $d = 1.57$ in the traditional instruction group). There was no statistically significant difference in overall performance in the two groups. Nevertheless, the Duolingo group improved more in vocabulary and listening and the traditional group had a marginally higher improvement in grammar and reading. These findings indicate that the both methods are effective and can be employed complementary to each other, especially in building various subskills in language. The study suggests a Skill Complementarity Framework to explain such differences.

Introduction

The development of digital technologies has had significant implications on English language teaching and learning. Among the most popular applications in mobile-assisted learning (MALL), Duolingo has emerged as game-like practice in different languages in the form of short, repetitive exercises with immediate feedback. Steiner (2024) reports that the application is used on a regular basis by hundreds of millions of users worldwide. Duolingo is gaining popularity in numerous ELL environments, such as university ones, as an additional or, in a few instances, a partial replacement of traditional classroom learning (Long, 2014; Vesselinov, 2012). Research on MALL generally presupposes that there are positive effects of mobile applications on vocabulary acquisition, motivation, and learner autonomy (Yang, 2023). Studies indicate that there are observable benefits in vocabulary and listening and some studies indicate that classroom instruction is still effective in grammar, extended reading and productive skills (Vidal, 2011). In this way, controlled comparative study research examines the development of the English language proficiency in intermediate-level university students studying with Duolingo and in classrooms. It also creates a new theoretical framework, the Skill Complementarity Framework, that is grounded on recent findings in

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second language learning (SLA) and MALL, that considers Duolingo and classroom instruction to be complementary and not mutually exclusive. In this paper, the English language learners (ELLs) are referred to as learners of English as a second or foreign language.

The research questions that will lead this study are as follows:

RQ1: Does Duolingo have a significant effect on overall English language proficiency in comparison to traditional classroom instruction?

RQ2: Are there differences between Duolingo and classroom instruction across subskills (vocabulary, grammar, reading, and listening)?

RQ3: What are the perceptions of learners about the effectiveness of both learning modes?

Literature Review

Since 2020, there has been an accumulating amount of literature that studies how Duolingo and similar apps can be used in both formal and informal contexts of learning English language. The pedagogical model of Duolingo consists of short exercises in gamified format, instant feedback, and encouragement of regular practice every day with help of such features as streaks and rewards (Shortt et al., 2021). Previous studies by Jiang et al. (2024) have established that students who had around 34 hours of Duolingo practice had reading proficiency equal to those students who were taking a first-semester course in university Spanish, but the research also indicated low progress in oral skills. Recent studies in the English language learning settings have indicated similar trends. In a different work, the same authors found that although learners had positive attitudes about Duolingo, the gains in standardized test scores were not always evident with the use of the app in an informal setting and without the teacher instructions or curriculum integration. Conversely, studies on conventional classroom teaching still show its applicability in a wide spectrum of language proficiencies. In classroom task-based and communicative approaches, Lai (2024) demonstrated that both comprehension and production could be achieved in significant increases. Likewise, the effect sizes of well-designed classroom interventions were medium to large in a meta-analysis study by Norris and Ortega (2000) and especially grammar and written accuracy. Even though a direct comparison of MALL and classroom teaching is rather scarce, the available research is informative. An example of this is the study by Pechenkina et al. (2017) and Jiang et al. (2021) which compared a mobile learning group that used a gamifying app with a traditional classroom group and discovered that both groups had significantly improved, though in different ways; the app-based group showed better results in terms of vocabulary and listening ($d = 0.60$), whereas the classroom group was more successful. Moreover, meta-analytic evidence indicates that about 75% of MALL studies have positive or mixed-positive results, but most of them lack rigorous experimental control and frequently overlook productive skills (speaking and writing) (Hunt, 2005). Reviews, including those by Yang et al. (2025), highlight that mobile applications are effective especially in vocabulary breadth development and simple grammatical structure practice because of their repetitive, high-frequency and spaced learning structure. Contrary to this, more complicated language skills, e.g., long reading, writing and more advanced use of grammar, usually need teacher mediation and more long-lasting, discourse-level interaction, which are more typical of classroom teaching. Theoretically, the ideas of this study are based on the models of interactionist and input-output feedback of Second Language Acquisition (SLA), where the significance of comprehensible input, the opportunity to produce, and the corrective feedback are

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emphasized (Yang et al., 2023). The main difference between Duolingo and classroom education is that the former is more input-based and offers feedback in real time and as a form, but the latter provides more interaction and promotes oral and written language (Kazu & Kuvvetli, 2026). Moreover, motivation theories, especially the self-determination theory, can be used to explain the ways gamified applications can increase the engagement of learners by promoting autonomy, competence, and relatedness (Li, Hew, and Du, 2024). On the basis of this theoretical and empirical background, it is theorized that micro-skills, including vocabulary acquisition, simple grammar patterns, and short listening tasks are best learned through app-based learning because they are repetitive and rich in feedback. Conversely, the classroom instruction is likely to favor macro-skills, e.g., the use of complex grammar, reading comprehension, and discourse-level processing, with the help of longer-term tasks, negotiated interaction, and teacher feedback. In this study, the researcher operationalizes this point of view by looking at proficiency improvement in terms of subskills in both Duolingo-based and classroom-based learning scenarios.

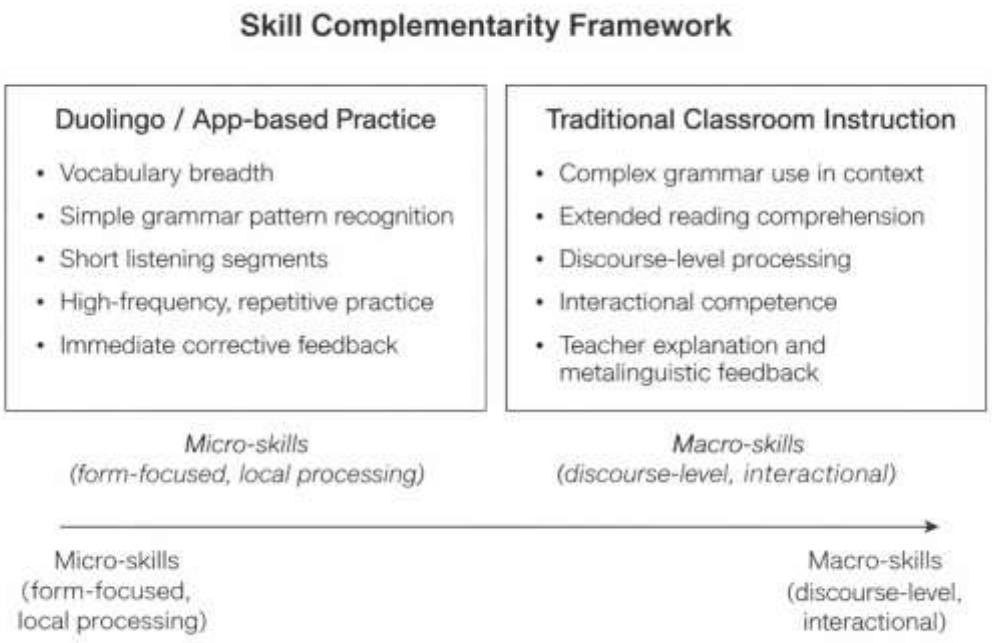

Figure. Skill Complementarity Framework

Figure 1 above shows Duolingo is conceptually connected with micro-skills and classroom instruction is connected with macro-skills. The recent literature has created a distinct research gap. Numerous Duolingo-related studies involve learners at the beginner level or engaged in self-study outside an institutional context (Kazu & Kuvvetli, 2026). Second, very few studies disaggregate proficiency gains by subskill and provide separate scores of vocabularies, grammar, reading, and listening, which complicates testing the complementarity hypothesis (Nushi, 2017). Third, there is a relative dearth of studies that provide detailed quantitative comparisons based on standardized tests over a fixed time frame during regular university coursework. The study is a direct response to these gaps, as it applies a quasi-experimental comparison of Duolingo and traditional classroom instruction learning in an intermediate university ELL setting, with a standardized test administered and subskill scores reported, along with effect sizes.

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METHODOLOGY

RESEARCH DESIGN

The research design used was a quasi-experimental pre-test/ post-test control group design to investigate the relative efficacy of Duolingo and in-classroom teaching. This design was suitable in preserving natural classroom conditions because of practical limitations in the institutional setting, which necessitated the use of intact classes instead of random assignment. They were divided into two groups: an experimental group, which used Duolingo as the main learning resource, and a control group, which was taught by a teacher.

The two groups were evaluated with the same pre-tests and post-tests to determine the changes in English language proficiency with time. The intervention lasted eight weeks, with each group having about four hours of instruction per week, which made the total number of instructional hours 32. The mode of delivery was significantly different in the two groups despite the fact that the instructional time was the same. This design enabled the assessment of improvement in each group and also comparison between groups including analysis of particular language subskills like vocabulary, grammar, reading, and listening.

Setting and Participants

In order to be consistent, the weekly usage of the participants was tracked using instructor logs and app activity tracking. The research was carried out in a state-owned university in Bahawalpur, Pakistan. Students had to do given tasks and adherence was checked on a weekly basis. The respondents were aged 18-23 years and had at least six years of previous English language education. Their level of proficiency was identified as intermediate (B1-B1+) according to a university-based placement test that was in accordance with the Common European Framework of Reference to Languages (CEFR). The sample was balanced in two groups, 30 students in Duolingo group and 30 students in traditional classroom group.

The inclusion criteria included enrollment in undergraduate programs, intermediate-level proficiency, and participation in the study. The research process was conducted with a lot of ethical considerations. Informed consent was obtained by all participants, they were assured of confidentiality and anonymity, and told that they could withdraw at any point in the study without any academic repercussions. Since the quasi-experimental design was employed, it was not possible to randomly assign, which can be a limitation to the generalizability of the findings.

Data Collection Method and Analysis

The analyses were conducted after ensuring that all assumptions of normality and homogeneity of variance were satisfied. Table 1 presents the mean scores and standard deviations of overall English proficiency (maximum = 100) for both the pre-test and post-test.

Table 1. Pre and Post test of Duolingo and Traditional Group

Group	N	Pre-test M (SD)	Post-test M (SD)	t (df)	p	Cohen's d
Duolingo Group	30	56.3 (6.8)	70.4 (7.1)	9.45 (29)	< .001	1.73
Traditional Group	30	55.8 (7.0)	68.1 (6.5)	8.62 (29)	< .001	1.57

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These huge effect sizes show a significant practical influence of both instructional strategies on language proficiency. The groups showed significant improvement and mean scores have increased over 12 points as indicated in Table 1. The results of both groups were statistically significant ($p < .001$), and they were confirmed by paired-sample t-tests. The effect sizes ($d = 1.73$ and 1.57) were also high. Independent-samples t-test revealed that there was non-significant yet small difference in support of Duolingo condition ($t(58) = 1.34$, $p > .05$), which implied that both strategies were equally efficient in general. To further delve into the distinction of subskills Table 2 presents the pre-test and post-test results of vocabulary and grammar.

Table 2. Comparing Vocabulary and Grammar

Subskill	**Group**	**Pre-test M (SD)**	**Post-test M (SD)**	**t (df)**	**P**
Vocabulary (20)	Duolingo	11.5 (2.3)	16.8 (2.1)	10.12 (29)	< .001
	Traditional	11.3 (2.5)	15.2 (2.4)	7.40 (29)	< .001
Grammar (20)	Duolingo	14.0 (2.8)	17.1 (2.6)	5.80 (29)	< .001
	Traditional	13.9 (2.9)	17.8 (2.3)	6.32 (29)	< .001
Reading (10)	Duolingo	7.1 (1.2)	8.6 (1.0)	4.21 (29)	< .001
	Traditional	7.0 (1.1)	8.9 (0.9)	4.55 (29)	< .001
Listening (10)	Duolingo	5.1 (1.4)	7.9 (1.2)	7.05 (29)	< .001
	Traditional	5.0 (1.5)	7.1 (1.3)	6.02 (29)	< .001

As shown in Table 2, there was a significant improvement in both groups in all four subskills ($p < .001$). But, the amount of improvement was different among the groups. The Duolingo group showed more gains (between 11.5 and 16.8) than the traditional group (between 11.3 and 15.2). The same tendency was observed with listening, as the Duolingo group scored higher (5.1 to 7.9) as compared to the traditional group (5.0 to 7.1), and this means that a slight benefit was favoring the app-based method of learning. These subskills are further compared statistically between the groups in the post-test in Section 4.3 and Table 3. On the contrary, the traditional group was a bit better in grammar (17.8 vs. 17.1) and reading (8.9 vs. 8.6). These findings are also supported by learner perception data. The students in the Duolingo group said that they enjoyed it more and felt they improved vocabulary and listening more, but the students in the traditional group rated grammar explanation and reading higher. On the whole, these impressions are in line with the test results.

Table 3 Subskill comparisons between groups

Subskill (Max Score)	**Group**	**Post-test M (SD)**	**t (58)**	**p**	**Cohen's d**
Vocabulary (20)	Duolingo	16.8 (2.1)	2.75	.008	0.71
	Traditional	15.2 (2.4)			

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Grammar (20)	Duolingo	17.1 (2.6)	−1.10	.274	−0.28
	Traditional	17.8 (2.3)			
Reading (10)	Duolingo	8.6 (1.0)	−1.22	.227	−0.32
	Traditional	8.9 (0.9)			
Listening (10)	Duolingo	7.9 (1.2)	2.48	.016	0.64
	Traditional	7.1 (1.3)			

The statistical comparisons of these subskills between groups at the post-test are presented in section 4.3 and Table 3. Independent-samples t-tests were used to compare the performance of the two groups in each subskill (vocabulary, grammar, reading, and listening; see Table 3). Both vocabulary, t (58) = 2.75, p =.008, d = 0.71, and listening, t (58) = 2.48, p =.016, d = 0.64, showed a medium-to-large effect size difference between the Duolingo and traditional classroom groups. Conversely, the traditional classroom group had a minor advantage in grammar, t (58) = -1.10, p = .274, d = -0.28, and reading, t (58) = -1.22, p = .227, d = -0.32 but these were small and not significant. All in all, the findings can be empirically explained by the Skill Complementarity Framework (Figure 1): Duolingo presented a higher level of benefits to micro-skills (vocabulary and short listening), whereas classroom instruction presented a mild, non-significant benefit of macro-skills (grammar accuracy and reading Comprehension).

Discussion

The results show that both Duolingo-based and traditional classroom teaching lead to significant improvements in general English proficiency, but their mechanisms appear to operate through distinct skill sets. The greater vocabulary and listening improvement in the Duolingo group are consistent with previous findings highlighting the importance of mobile-assisted learning for frequent exposure, repetition, and instant corrective feedback, which are especially useful for receptive and form-based development (Paradis, 2011). Nevertheless, these results are in line with expectations for gamified learning settings, but the interpretation might be biased towards overestimating causality, as the gains might be due to the learner's motivation or familiarity with mobile applications in general, rather than the intervention itself.

Conversely, the comparatively small and non-significant differences in grammar and reading between groups indicate that the presumed advantage of one instructional mode over the other in teaching macro-skills is not well supported by this data. The trend is consistent with the Skill Complementarity Framework (Figure 1), but the framework itself is more descriptive than explanatory at this point and has not been adequately tested against other models of skill acquisition (Stephany and Teutloff, 2024). The connection between classroom teaching, explicit instruction, and prolonged input also aligns with existing SLA views (Gorman and Ellis, 2019), but the research does not identify the specific pedagogical elements that had the greatest impact.

The current findings are partially supported by previous studies, especially regarding vocabulary and listening benefits in app-based learning (Vidal, 2011) and minimal overall proficiency impacts in certain Duolingo settings (Kazu and Kuvvetli, 2026). However, critical methodological constraints are underrepresented in the discussion. The brief intervention duration, the comparatively small sample size, the lack of random assignment, and the omission of speaking and writing limit the strength and applicability of the conclusions. Also, teacher variability and disproportionate engagement patterns were not systematically controlled, which could have influenced the results.

In general, although the research indicates the complementary affordances of the two

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instructional modes, the discussion could be enhanced by a more critical interrogation of causal assertions and by a more active engagement with methodological constraints that could moderate the strength of the findings.

Conclusion and Implications

This comparison shows that both the practice based on Duolingo and the practice in the classroom are effective in improving the general English competency of the Islamia university students. The Duolingo group exhibited more vocabulary and listening gains, but the traditional group showed a little higher gain in grammar and reading. Taken together with the perceptions of learners, these results allow adding further empirical evidence to a complementary view of Mobile-Assisted Language Learning (MALL) and classroom teaching. On the basis of these findings, English departments and language centers are invited to consider Duolingo a part of their program as a structured out-of-class vocabulary and listening development tool, so long as its application is monitored and aligned with course goals. This would enable classroom time to be put to better use through communicative activities, extensive reading and writing and explicit grammar instruction through teacher guidance. By doing so the merits of both methods can be brought to work together instead of being perceived as competing methods.

The current study can be expanded by future studies that include speaking and writing skills, increase the length of interventions, and consider the effect of individual differences (motivation, metacognitive awareness, and digital literacy) on the learning outcomes. Further studies of the particular types of exercises of Duolingo, and their correspondence to the classroom curricula would additionally elaborate the Skill Complementarity Framework, as well as would make it more useful in curriculum development. This paper has emphasized the need to combine technology and traditional instruction as opposed to considering them as rival methods. A balanced, blended model can offer the best channel of language development.

REFERENCES

Arif, M., Ismail, A., Aqib, M., Shaoan, M. R., Ali, W., & Okafor, M. U. (2025). The impact of AI-driven tools on foreign students' Chinese language acquisition: A case study at Southwest University. *Language, Technology, and Social Media*, *3*(1), 150-168.

Burston, J. (2015). Twenty years of MALL project implementation: A meta-analysis of learning outcomes. *ReCALL*, *27*(1), 4-20.

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, *11*(4), 227-268.

Ellis, R. (2009). Task-based language teaching: Sorting out the misunderstandings. *International journal of applied linguistics*, *19*(3), 221-246.

Gorman, M., & Ellis, R. (2019). The relative effects of metalinguistic explanation and direct written corrective feedback on children's grammatical accuracy in new writing. *Language Teaching for Young Learners*, *1*(1), 57-81.

Hunt, A., & Beglar, D. (2005). A framework for developing EFL reading vocabulary. *Reading in a foreign language*, *17*(1), 23-59.

Jiang, X., Peters, R., Plonsky, L., & Pajak, B. (2024). The effectiveness of Duolingo English courses in developing reading and listening proficiency. *CALICO Journal*, *41*(3), 249-272.

Jiang, Y., Chen, Y., Lu, J., & Wang, Y. (2021). The effect of the online and offline blended teaching mode on English as a foreign language learners' listening

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ISSN Print: 3007-3146

performance in a Chinese context. *Frontiers in psychology*, *12*, 742742.

Kazu, İ. Y., & Kuvvetli, M. (2026). Digital language learning with Duolingo: assessing its impact on listening, speaking, reading, and writing skills. *Journal of Computers in Education*, *13*(1), 165-191.

Li, L., Hew, K. F., & Du, J. (2024). Gamification enhances student intrinsic motivation, perceptions of autonomy and relatedness, but minimal impact on competency: a meta-analysis and systematic review. *Educational technology research and development*, *72*(2), 765-796.

Loewen, S., Crowther, D., Isbell, D. R., Kim, K. M., Maloney, J., Miller, Z. F., & Rawal, H. (2019). Mobile-assisted language learning: A Duolingo case study. *ReCALL*, *31*(3), 293-311.

Long, M. (2014). *Second language acquisition and task-based language teaching*. John Wiley & Sons.

Norris, J. M., & Ortega, L. (2000). Effectiveness of L2 instruction: A research synthesis and quantitative meta-analysis. *Language learning*, *50*(3), 417-528.

Nushi, M., & Eqbali, M. H. (2017). Duolingo: A Mobile Application to Assist Second Language Learning. *Teaching English with Technology*, *17*(1), 89-98.

Paradis, J. (2011). Individual differences in child English second language acquisition: Comparing child-internal and child-external factors. *Linguistic approaches to bilingualism*, *1*(3), 213-237.

Shortt, M., Tilak, S., Kuznetcova, I., Martens, B., & Akinkuolie, B. (2023). Gamification in mobile-assisted language learning: A systematic review of Duolingo literature from public release of 2012 to early 2020. *Computer Assisted Language Learning*, *36*(3), 517-554.

Steiner, L. (2024). Duolingo (2024). *Die Unterrichtspraxis/Teaching German*, *57*(2).

Stephany, F., & Teutloff, O. (2024). What is the price of a skill? The value of complementarity. *Research Policy*, *53*(1), 104898.

Swain, M. (2005). The output hypothesis: Theory and research. In *Handbook of research in second language teaching and learning* (pp. 471-483). Routledge.

Vesselinov, R., & Grego, J. (2012). Duolingo effectiveness study. *City University of New York, USA*, *28*(1-25).

Vidal, K. (2011). A comparison of the effects of reading and listening on incidental vocabulary acquisition. *Language learning*, *61*(1), 219-258.

Wulff, S., & Gries, S. T. (2019). Particle placement in learner language. *Language Learning*, *69*(4), 873-910.

Yang, W., & Ying, Z. (2025). Exploring the potential of gamified reading: the effects of duolingo on L2 reading, self-efficacy, and learner experiences in a Chinese university EFL context. *BMC psychology*.

Yang, Y., Wen, Y., & Song, Y. (2023). A systematic review of technology-enhanced self-regulated language learning. *Educational Technology & Society*, *26*(1), 31-44.

Appendix

Appendix A

Instruments and Supporting Materials

A.1 English Proficiency Test (B1 Level Adaptation)

The English proficiency test applied in this research was modified based on a standard B1-level test that is related to the Common European Framework of Reference to Languages (CEFR). Two language teachers have revised it to guarantee the content

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validity and suitability to the intermediate level learners.

The test was divided into four parts:

Vocabulary (20 items): Multiple-choice items measuring word meaning, synonyms and contextual use.

Grammar (20 items): Sentence completion and error correction tasks about intermediate grammatical structures.

Reading (10 items): Brief passages and subsequent comprehension questions (main idea, inference, and detail recognition).

Listening (10 items): Audio-based comprehension tests that evaluate knowledge about short dialogues and informational texts.

Total Score: 100 marks

A.2 Pre-Test and Post-Test Administration Procedure.

Both tests, the pre-test, and post-test, were performed in standardized classroom environments. Each participant was given the tests separately under an examiner with the aim of ensuring that they were given an equal opportunity to get the best result without any external help.

Duration: 60 minutes

Setting: Managed classroom.

Instructions: They are in English and explained prior to the commencement.

Scoring: Objective scoring rubric on all sections.

A.3 Duolingo Intervention Guidelines

The members of the Duolingo group were asked to utilise the app as the primary tool of learning English over a period of 8 weeks.

Key guidelines included:

Minimum use: 90 minutes in a week.

Observation: Weekly tracking by the instructor.

Activities: Vocabulary, grammar, listening and reading-based lessons.

Characteristics applied: Streaks, levels and in-app feedback system.

Students were advised to do their daily practice consistently instead of doing the sessions at a given time.

A.4 Classroom Instruction Plan (Traditional).

The traditional group of instruction adhered to the teacher-centered model of learning which is founded on the textbook instruction.

Key components included:

The explanations of grammar given by the instructor.

Exercises on reading comprehension of course textbooks.

Auditory activities with audio recordings in the classroom.

List-based vocabulary, exercises and repetitions.

Teaching focused on organized lessons, teacher feedback and practice.

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A.5 Learner Perception Questionnaire (Sample Items)

Perceptions of the learners were measured with a 10-item Likert-scale questionnaire (1 = Strongly Disagree, 5 = Strongly Agree), which was conducted post-intervention.

Sample items included:
I liked studying English in this way.
The technique enhanced my vocabulary.
The technique enhanced my listening.
This technique enhanced my grammar.
This technique enhanced my understanding of reading.
I was inspired in the learning process.
I would prefer to carry on with this approach in the future.
The learning method was easy to use and understand.
I got constructive feedback in the course of learning.
On the whole, this approach contributed to the enhancement of my English level.

A.6 Ethical Considerations

This study followed ethical research guidelines. All the participants gave informed consent to participate and this was voluntary. The intent of the study was communicated to students and anonymity of responses was guaranteed. Participants were also told that they would not be penalized in case they dropped out at any point.

A.7 Data Analysis Procedures

Statistical analysis was applied to all quantitative data, it included:
Descriptive statistics (mean, standard deviation)
Paired-sample t-tests (in-group comparison)
Independent t-tests (between-group comparison).
Cohen d as a measure of effect size.

Assumptions of normality and homogeneity of variance were checked prior to analysis.