

Enhancing English Idiom Comprehension Through *Idiomatch*: Evidence from A Mobile-Assisted Language Learning Application

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ABSTRACT

English idioms remain challenging for EFL learners because their figurative meanings cannot always be interpreted literally, while empirical evidence on mobile applications specifically designed for idiom learning remains limited. This study investigated the effectiveness of *Idiomatch*, a gamified mobile-assisted language learning application, in improving university students' English idiom comprehension and examined students' perceptions of its use. A quasi-experimental pretest-posttest nonequivalent control group design involved 60 undergraduate students from an English Education program, with 30 students in the experimental group and 30 in the control group. The four-week intervention comprised eight instructional sessions. Data were collected through a 25-item idiom comprehension test and a 10-item perception questionnaire and analyzed using descriptive statistics, an independent-samples *t*-test, and Analysis of Covariance (ANCOVA). The experimental group improved from a pretest mean of 58.27 (SD = 10.80) to a posttest mean of 83.47 (SD = 7.84), while the control group increased from 63.73 (SD = 8.72) to 67.33 (SD = 7.36). The posttest difference was statistically significant, $t(58) = 8.22$, $p < .001$, Cohen's $d = 2.12$, and ANCOVA indicated that the group difference remained significant after controlling for pretest performance. Students also reported generally positive perceptions of *Idiomatch*. These findings suggest that contextualized, gamified mobile learning may serve as a useful supplementary approach to English idiom instruction in higher education, although the results should be interpreted cautiously because of the short intervention and nonequivalent intact groups.

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1. INTRODUCTION

English idioms are an essential component of communicative competence because they convey figurative meanings that cannot be taken literally. Mastering idiomatic expressions enables learners to communicate more naturally and to understand authentic English discourse across academic and social contexts (Hinkel, 2016; Lontas, 2017; MacArthur & Alejo-González, 2024). However, idioms

remain among the most difficult aspects of English learning for students in English as a Foreign Language (EFL) settings because of their semantic opacity, cultural specificity, and contextual nature. Learners frequently struggle to infer intended meanings, distinguish literal from figurative interpretations, and use idioms appropriately in communication (Boers, 2021; Chanturia & Sonbul, 2025; El Majidi, 2026). These challenges become more apparent in higher education, where students are expected to develop advanced language proficiency that extends beyond grammatical knowledge and vocabulary mastery (Hinkel, 2016). Recent studies also highlight that insufficient exposure to authentic language use continues to hinder learners' idiomatic competence (MacArthur & Alejo-González, 2024).

Despite the recognized importance of idiom instruction, many EFL classrooms still rely on memorization, direct translation, and isolated vocabulary exercises (Boers, 2021; Grant & Bauer, 2004; Hinkel, 2016). Although these approaches may improve lexical knowledge, they rarely provide meaningful contexts that help learners understand how idioms function in authentic communication. Idiomatic expressions require repeated exposure, contextual practice, and immediate feedback, elements often missing from conventional teacher-centered instruction. As a result, students tend to remember individual expressions without developing the ability to interpret or use them appropriately in real communicative situations. Researchers have therefore advocated more interactive, learner-centered instructional approaches that promote active engagement with figurative language (Grant & Bauer, 2004). More recent evidence also suggests that contextualized learning activities significantly contribute to long-term retention of idiomatic expressions (Boers, 2021; Chanturia & Sonbul, 2025; Lontas, 2017).

The rapid development of Mobile-Assisted Language Learning (MALL) offers new opportunities to address these instructional limitations. Mobile applications enable learners to access learning materials anytime and anywhere, supporting self-paced, personalized, and interactive learning experiences (Crompton & Burke, 2020; Elaish et al., 2019; Kacatl & Klímová, 2019). When combined with gamification elements such as quizzes, challenges, rewards, and instant feedback, mobile learning has been shown to increase learner engagement, motivation, and language achievement (Dichev & Dicheva, 2017; Nadeem et al., 2023; Rajendran & Yunus, 2021). Numerous studies have confirmed the effectiveness of MALL for vocabulary acquisition and other language skills, and gamified environments encourage repeated practice and sustained learner participation (Rajendran & Yunus, 2021). Nevertheless, empirical research has primarily focused on general vocabulary learning rather than the acquisition of English idioms (Nadeem et al., 2023; Rajendran & Yunus, 2021; Sung et al., 2015).

Despite growing interest in MALL, several research gaps remain. Existing studies rarely evaluate mobile applications specifically designed for idiom instruction using rigorous quasi-experimental designs (Elaish et al., 2019; Kacatl & Klímová, 2019; Rajendran & Yunus, 2021). Furthermore, evidence from Indonesian higher education remains limited, even though university students in Indonesia have relatively restricted exposure to authentic English outside the classroom, and idiom instruction receives limited emphasis in many English courses. Consequently, little is known about whether a dedicated Android-based application can significantly improve idiom comprehension compared with conventional instruction. Addressing this gap is important for extending current knowledge of mobile-assisted idiom learning and for providing empirical evidence for integrating specialized mobile applications into EFL instruction (Crompton & Burke, 2020; MacArthur & Alejo-González, 2024; Nadeem et al., 2023).

Although previous studies have consistently reported positive outcomes in mobile-assisted language learning, most existing applications remain focused on general vocabulary acquisition, grammar practice, pronunciation, or integrated language skills. Widely used applications such as Duolingo, Memrise, and Quizlet promote vocabulary learning through repetition and gamification but offer limited opportunities to develop learners' understanding of figurative language, particularly English idioms that require contextual interpretation and cultural awareness. In contrast, *Idiomatch* was specifically developed to facilitate idiom learning through contextual

matching activities, interactive quizzes, immediate feedback, and repeated retrieval practice in a mobile environment. These features were intentionally designed to encourage meaningful engagement with idiomatic expressions rather than simple memorization of vocabulary. Despite these pedagogical advantages, no empirical study has systematically examined *Idiomatch*'s effectiveness using a quasi-experimental design in the Indonesian higher education EFL context. Consequently, its instructional value and potential contribution to idiom learning remain largely unexplored (Kaceti & Klímová, 2019; Nadeem et al., 2023; Rajendran & Yunus, 2021).

The Indonesian higher education context offers an important setting for investigating the effectiveness of mobile-assisted idiom learning. Because English is a foreign language, university students generally have limited exposure to authentic English interactions outside the classroom, which reduces their opportunities to encounter idiomatic expressions in everyday communication. In many English education programs, instruction continues to prioritize grammatical competence and academic reading, while figurative language receives comparatively less attention despite its importance for communicative and intercultural communication. This issue is particularly relevant for pre-service English teachers, who are expected not only to achieve advanced language proficiency but also to teach authentic language use in future classrooms. At the same time, the widespread ownership of smartphones among Indonesian university students creates favorable conditions for integrating mobile learning into English instruction. Evaluating the effectiveness of a dedicated idiom-learning application is therefore expected to provide practical evidence for technology-enhanced language learning in Indonesian universities and similar EFL contexts (Ratri et al., 2025; Sakhiyya et al., 2018; Tristiana et al., 2024).

Based on these considerations, this study aimed to investigate the effectiveness of the *Idiomatch* application in improving university students' comprehension of English idioms and to examine students' perceptions of its use as a supplementary mobile-assisted learning tool. Specifically, the study addressed the following research questions:

1. To what extent does the use of the *Idiomatch* application improve university students' English idiom comprehension compared with conventional classroom instruction after controlling for initial differences in pretest performance?
2. How do students perceive the usefulness, ease of use, learning support, motivation, and overall learning experience provided by the *Idiomatch* application?

Accordingly, the study hypothesized that students receiving instruction supported by *Idiomatch* would demonstrate significantly higher posttest idiom-comprehension scores than students receiving conventional instruction after their initial pretest performance was statistically controlled. By focusing on a mobile application specifically designed for contextualized idiom learning, this study seeks to extend research on Mobile-Assisted Language Learning (MALL) beyond general vocabulary learning and provide evidence regarding its pedagogical application in Indonesian higher education.

2. METHODS

This study employed a quasi-experimental pretest-posttest nonequivalent control group design to investigate the effectiveness of the *Idiomatch* application in improving university students' comprehension of English idioms. The participants were 60 undergraduate students enrolled in the English Education Study Program at Universitas Muhammadiyah Semarang. Two intact classes were selected because the existing classroom organization could not be modified for administrative purposes. The experimental group consisted of 30 second-semester students, while the control group comprised 30 fourth-semester students. Both groups followed the same course learning outcomes and instructional content related to idiomatic expressions.

Because the participants were drawn from existing classes and were not randomly assigned to experimental conditions, complete equivalence between the two groups could not be assumed. In particular, the groups differed in semester level, which may reflect differences in academic

experience and previous exposure to English. Therefore, the pretest was administered to establish students' initial idiom-comprehension performance, and Analysis of Covariance (ANCOVA) was subsequently used to statistically adjust posttest comparisons for differences in baseline scores. Nevertheless, the use of ANCOVA does not completely eliminate possible selection effects associated with the use of nonequivalent intact classes; therefore, this issue was considered when interpreting the findings.

The instructional intervention was conducted over four weeks and consisted of eight 90-minute sessions. The experimental group received instruction supported by *Idiomatch*, a mobile-accessible web-based learning application containing approximately 300 intermediate-level English idioms. The application included contextual matching activities, quizzes, automatic scoring, progress monitoring, example sentences, bilingual search functions, and immediate corrective feedback. These features were designed to provide repeated retrieval opportunities, contextualized practice, and opportunities for independent review.

The control group received conventional classroom instruction involving teacher explanation, textbook-based exercises, translation activities, and classroom discussion. Both groups addressed comparable course objectives, target idioms, instructional duration, and learning outcomes. However, because the study involved intact classes from different semester levels, the instructional medium should not be interpreted as the only possible difference between the groups. Statistical adjustment using pretest performance was therefore employed to reduce the influence of initial differences when estimating the instructional effect.

Students' perceptions of the *Idiomatch* application were measured using a 10-item questionnaire administered to the 30 participants in the experimental group after the intervention. Responses were recorded on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The questionnaire covered perceived usefulness, ease of use, learning support, motivation, feedback, confidence, independent learning, and overall satisfaction. Two English language teaching experts reviewed the items for content relevance and clarity before administration.

Questionnaire responses were analyzed descriptively using means, standard deviations, frequencies, and percentages. Because the questionnaire was used primarily to provide descriptive information regarding students' perceptions and its internal consistency was not empirically examined, the perception findings should be interpreted as supplementary evidence rather than as a validated measurement of a latent technology-acceptance construct.

Quantitative data were analyzed using IBM SPSS Statistics. Descriptive statistics summarized students' learning outcomes. Assumptions of normality, homogeneity of variance, and homogeneity of regression slopes were checked before hypothesis testing. An independent-samples t-test was used to compare posttest scores between groups. Since classes were intact, ANCOVA was used, controlling for baseline differences using pretest scores. Significance was set at .05, with Cohen's *d* and partial eta squared (η^2) reporting effect sizes. Responses to the perception questionnaire were summarized with frequencies, percentages, means, and standard deviations.

3. FINDINGS AND DISCUSSION

3.1 Descriptive Statistics of Students' Idiom Comprehension Scores

To provide an initial overview of students' learning outcomes, descriptive statistics were calculated for the pretest and posttest scores of both the experimental and control groups.

Table 1. Descriptive Statistics of Students' Idiom Comprehension Scores

Group	N	Pretest Mean	SD	Posttest Mean	SD	Mean Gain
Experimental	30	58.27	10.80	83.47	7.84	+25.20
Control	30	63.73	8.72	67.33	7.36	+3.60

As shown in Table 1, both groups demonstrated comparable levels of idiom comprehension prior to the intervention, although the control group obtained a slightly higher mean pretest score ($M = 63.73$, $SD = 8.72$) than the experimental group ($M = 58.27$, $SD = 10.80$). These initial differences were expected because the study employed intact classes rather than randomly assigned participants.

Following the four-week instructional intervention, the experimental group showed a marked improvement in idiom comprehension, achieving a mean posttest score of 83.47 ($SD = 7.84$). In comparison, the control group attained a mean score of 67.33 ($SD = 7.36$) after receiving conventional classroom instruction. The improvement was also reflected in the mean gain scores, with students in the experimental group increasing their performance by 25.20 points, whereas those in the control group improved by only 3.60 points.

Based on the data, the descriptive statistics indicate a substantially greater improvement among students who learned using the *Idiomatch* application than among those who received traditional instruction. Although descriptive findings alone cannot establish statistical significance, the observed differences suggest a positive trend that warrants further inferential analysis.

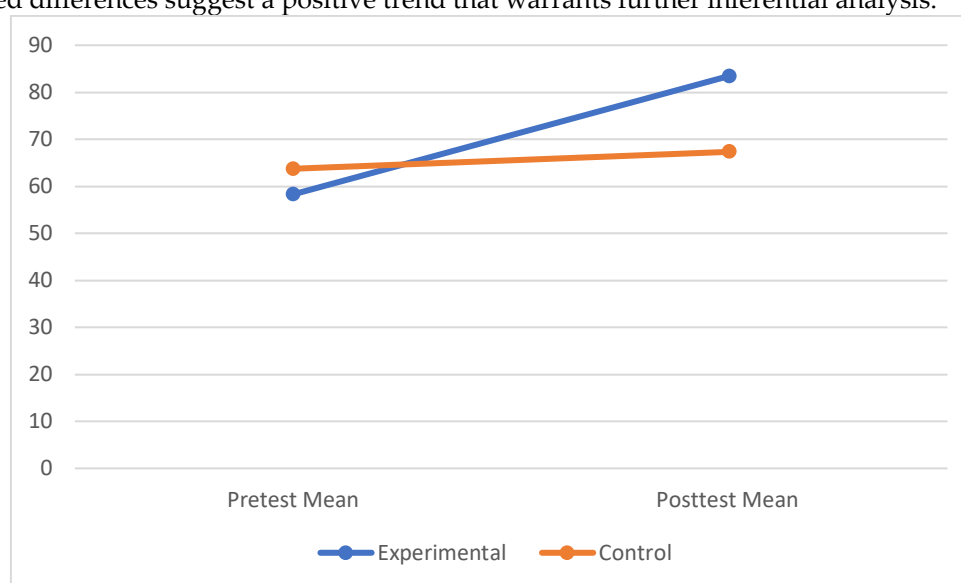


Figure 1. Changes in Students' Mean Scores Before and After the Intervention

Figure 1 shows a clear pattern of change. Both groups began the course with comparable proficiency levels, although the control group had a slightly higher pretest average. After four weeks of intervention, the experimental group showed significantly greater improvement than the control group. This pattern provides visual evidence that the use of *Idiomatch* contributed to improved English idiom comprehension, which was further confirmed through inferential analysis using independent-samples *t*-tests and ANCOVA.

3.2 Effect of *Idiomatch* on Students' Idiom Comprehension

To determine whether the observed differences between the two groups were statistically significant, an independent-samples *t*-test was first conducted using students' posttest scores.

Table 2. Independent-Samples *t*-Test Comparing Posttest Scores

Variable	t	df	p	Cohen's d
Posttest scores	8.22	58	< .001	2.12

As presented in Table 2, the independent-samples *t*-test revealed a statistically significant difference in posttest scores between the experimental and control groups, $t(58) = 8.22$, $p < .001$. Students who learned using the *Idiomatch* application achieved significantly higher posttest scores

than those who received conventional classroom instruction. The calculated effect size (Cohen's $d = 2.12$) indicates a very large practical effect, suggesting that the instructional intervention substantially improved students' comprehension of English idioms.

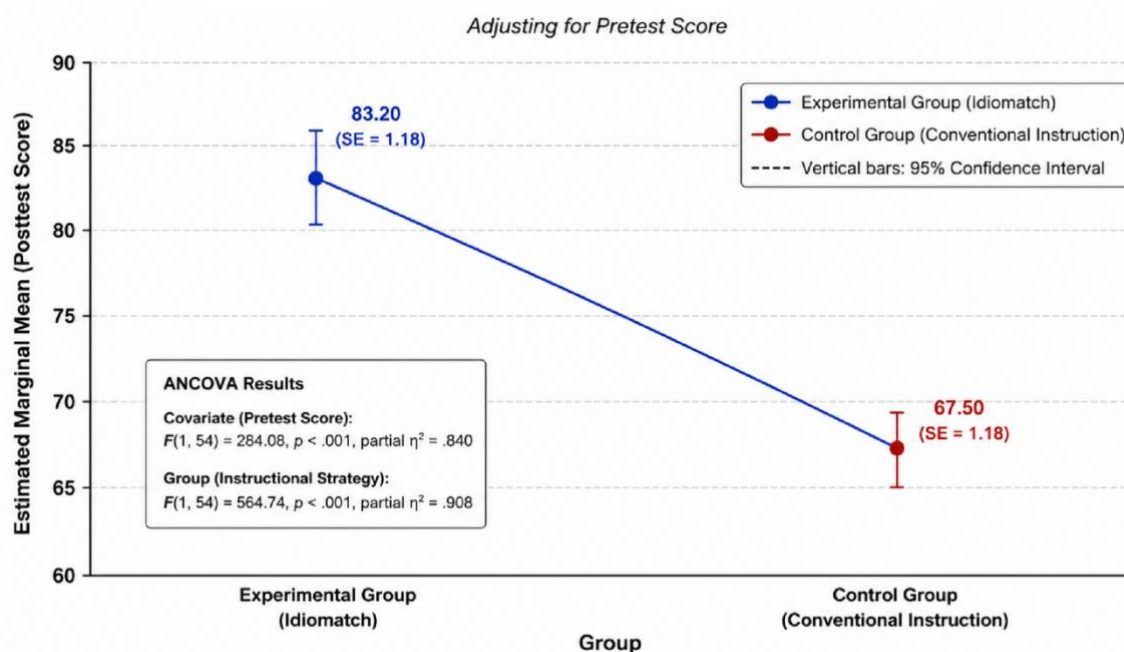
Although the independent-samples t -test indicated a significant unadjusted difference in posttest performance, this comparison did not account for initial differences between the intact classes. Therefore, ANCOVA was conducted as the primary analysis, with posttest scores as the dependent variable, instructional group as the fixed factor, and pretest scores as the covariate. This approach provided an adjusted comparison of post-intervention performance while statistically controlling for baseline idiom-comprehension scores.

Prior to interpreting the ANCOVA results, the required assumptions were examined. The results indicated that the assumptions required for ANCOVA were sufficiently satisfied.

Table 3. ANCOVA Results for Students' Posttest Scores

Source	F	p	Partial η^2
Pretest (Covariate)	284.08	< .001	.840
Group	564.74	< .001	.908

The ANCOVA results showed a statistically significant effect of instructional strategy on students' posttest performance after controlling for pretest scores, $F(1,54) = 564.74$, $p < .001$. The large partial η^2 (.908) indicates that the instructional treatment had a substantial effect on students' idiom comprehension after accounting for initial differences between the two groups. The significant covariate effect also suggests that students' initial idiom knowledge contributed to their final achievement; however, the experimental group maintained significantly higher adjusted posttest scores than the control group. Figure 2 presents the adjusted posttest means after controlling for students' pretest performance. The graph confirms that the experimental group consistently outperformed the control group, supporting the statistical results presented in Table 3.



Note. Estimated marginal means are adjusted for the effect of pretest scores.

The experimental group achieved a significantly higher adjusted posttest score than the control group.

Figure 2. Adjusted Mean Posttest Scores Based on ANCOVA

3.3 Students' Perceptions of the Idiomatch Application

To complement the quantitative findings, students in the experimental group completed a post-intervention questionnaire to evaluate their perceptions of the *Idiomatch* application. The questionnaire consisted of ten statements measuring students' perceptions of the application's usefulness, usability, learning effectiveness, motivation, and overall satisfaction. The descriptive results are presented in Table 4.

Table 4. Students' Perceptions of the *Idiomatch* Application (N = 30)

Item	Mean	SD	Interpretation
I1. <i>Idiomatch</i> helps me understand English idioms more easily.	4.13	0.73	High
I2. The learning materials meet my learning needs.	3.93	0.87	High
I3. The interface and navigation are easy to use.	4.33	0.71	Very High
I4. The exercises help me remember English idioms better.	4.33	0.71	Very High
I5. <i>Idiomatch</i> improves my English vocabulary.	4.47	0.51	Very High
I6. <i>Idiomatch</i> increases my confidence in using English idioms.	4.27	0.58	Very High
I7. <i>Idiomatch</i> motivates me to learn English independently.	4.20	0.66	Very High
I8. The application features effectively support learning.	3.93	0.69	High
I9. I improved my understanding of English idioms.	3.93	0.58	High
I10. Overall, I am satisfied with <i>Idiomatch</i> as a learning medium.	3.80	0.76	High
Overall	4.13	0.71	High

Interpretation: 1.00–1.80 = *Very Low*; 1.81–2.60 = *Low*; 2.61–3.40 = *Moderate*; 3.41–4.20 = *High*; 4.21–5.00 = *Very High*.

As shown in Table 4, students held positive perceptions of the *Idiomatch* application, with an overall mean score of 4.13 (SD = 0.71), indicating high acceptance. Among the ten questionnaire items, Item 5 received the highest rating (M = 4.47, SD = 0.51), suggesting that students perceived the application as effective at expanding their English vocabulary. High ratings were also observed for the application's interface and navigation (Item 3; M = 4.33, SD = 0.71) and for the interactive exercises that supported idiom retention (Item 4; M = 4.33, SD = 0.71). In addition, students reported increased confidence in using English idioms (Item 6; M = 4.27, SD = 0.58) and greater motivation to learn independently (Item 7; M = 4.20, SD = 0.66).

Lower mean scores were observed for the overall satisfaction item (Item 10; M = 3.80, SD = 0.76) and for the perceived relevance of learning materials and application features (Items 2, 8, and 9; M = 3.93). Nevertheless, all items had mean scores above 3.80, indicating that students generally viewed the application positively across all measured aspects. These descriptive findings suggest that *Idiomatch* was well accepted as a mobile learning tool and provided a supportive learning experience during the instructional intervention.

Discussion

Effectiveness of *Idiomatch* in Enhancing Idiom Comprehension

The present study found that students who received instruction supported by *Idiomatch* demonstrated substantially greater improvement in English idiom comprehension than students receiving conventional classroom instruction. Importantly, the difference remained statistically significant after baseline pretest performance was taken into account through ANCOVA. The findings therefore provide evidence that the use of *Idiomatch* was associated with improved idiom-comprehension outcomes during the four-week intervention.

Nevertheless, the findings should be interpreted within the quasi-experimental nature of the study. Because intact classes were used and the experimental and control groups came from different semester levels, statistical adjustment of pretest performance cannot fully eliminate possible differences in prior academic experience, exposure to English, learner characteristics, or

other unmeasured variables. Consequently, the findings support the educational potential of *Idiomatch* but should not be interpreted as establishing an exclusively causal effect of the application.

The findings may also be explained by Dual Coding Theory, which holds that learning is more effective when verbal and visual information are processed simultaneously (Clark & Paivio, 1991; Paivio, 1991). Rather than presenting idioms as isolated vocabulary items, *Idiomatch* pairs contextual example sentences with interactive learning tasks and immediate semantic feedback. These multimodal representations likely helped students form stronger associations between idiomatic expressions and their figurative meanings. In addition, the application reflects Constructivist Learning Theory by encouraging learners to actively construct understanding through exploration, practice, and self-evaluation rather than passive memorization (Piaget, 1952; Vygotsky, 1978). This learner-centered approach enabled students to revisit unfamiliar idioms and monitor their own learning progress throughout the intervention.

The present findings extend previous research on mobile-assisted language learning (MALL). Earlier studies have consistently reported the positive effects of mobile applications and gamification on vocabulary learning and learner engagement (Dichev & Dicheva, 2017; Elaish et al., 2019; Kacetl & Klímová, 2019). However, most existing studies have focused on general vocabulary acquisition rather than figurative language, which requires contextual and cultural interpretation (Chanturia & Sonbul, 2025; Grant & Bauer, 2004; Liontas, 2017). By demonstrating the effectiveness of a mobile application specifically designed for idiom learning, this study broadens the use of MALL beyond conventional vocabulary instruction. More importantly, it provides empirical evidence that integrating retrieval practice, dual coding, and constructivist learning principles within a gamified mobile environment can effectively support English idiom acquisition in higher education.

The contribution of the present study lies not merely in evaluating a newly developed application, but in extending MALL research to an area of lexical competence that has received comparatively less empirical attention: the comprehension of English idiomatic expressions. Previous MALL studies have predominantly examined general vocabulary, speaking, grammar, or integrated language skills, whereas idioms require learners to interpret nonliteral meanings within linguistic and sociocultural contexts. By evaluating a purpose-built idiom-learning application through a controlled pretest-posttest design, this study provides context-specific evidence regarding how mobile-assisted, contextualized, and retrieval-oriented activities can be incorporated into idiom instruction in Indonesian higher education. Thus, the study contributes to the pedagogical discussion concerning how mobile technology can support learning targets that extend beyond literal vocabulary acquisition.

Students' Perceptions toward the *Idiomatch* Application

Students' generally positive perceptions of the *Idiomatch* application complement the quantitative findings by indicating that the improvement in idiom comprehension was accompanied by a favorable learning experience. The questionnaire results showed that students perceived the application as useful, easy to use, and supportive of independent learning. These perceptions suggest that *Idiomatch* functioned not merely as a digital delivery medium but as an interactive learning environment in which students engaged with idiomatic expressions through contextualized practice, repeated activities, and immediate feedback. Such findings can be interpreted through the Technology Acceptance Model, particularly the constructs of perceived usefulness and perceived ease of use, which have been widely associated with users' acceptance of educational technologies (Davis, 1989; Venkatesh, 2000; Venkatesh et al., 2003). Similar patterns have also been reported in mobile-assisted language learning research, where learners' positive perceptions of mobile technologies are associated with greater engagement and more supportive learning experiences (Crompton & Burke, 2020; Kacetl & Klímová, 2019).

The interactive features of *Idiomatch*, including matching activities, quizzes, and immediate corrective feedback, were also perceived positively by students. These features may have helped

shift idiom learning from a predominantly memorization-based activity toward a more active learning process involving repeated retrieval, response monitoring, and immediate reinforcement. This interpretation is consistent with previous studies showing that gamified learning environments can enhance learner engagement by integrating challenge, repetition, and feedback into instructional activities (Dichev & Dicheva, 2017; Hamari et al., 2014; Nadeem et al., 2023). In the context of idiom learning, such features may be particularly relevant because figurative expressions often require learners to move beyond literal word meanings and interpret language within contextual and cultural frames (Chanturia & Sonbul, 2025; Liontas, 2017). Therefore, the contribution of *Idiomatch* may lie not only in its technological format but also in the way its activities support repeated and contextualized engagement with figurative language.

Another notable finding concerns the potential of *Idiomatch* to support learner autonomy. Because the application could be accessed beyond scheduled classroom sessions, students were able to review unfamiliar idioms, repeat learning activities, and monitor their own progress at their preferred pace. This flexibility is consistent with established perspectives on learner autonomy, which emphasize learners' capacity to take greater responsibility for and control over their own learning processes (Benson, 2011; Holec, 1981). It is also consistent with recent discussions of mobile-assisted language learning, which highlight the role of mobile technologies in extending learning opportunities beyond formal classroom settings and enabling more self-directed forms of practice (Kukulska-Hulme, 2026). In this sense, the mobility and accessibility of *Idiomatch* may have provided students with additional opportunities to engage with idiomatic expressions independently.

At the same time, idiom learning cannot be understood solely as a matter of repeated practice. Idiomatic expressions are frequently shaped by cultural conventions and figurative meanings that may be unfamiliar to EFL learners. This issue is particularly relevant in contexts where students have limited exposure to authentic English outside the classroom. The positive responses to contextual examples therefore suggest that such examples may have helped learners interpret idioms beyond their literal meanings and connect them with more appropriate communicative contexts. This interpretation is consistent with previous literature emphasizing the importance of contextual and cultural knowledge in the learning of figurative and formulaic language (Chanturia & Sonbul, 2025; Liontas, 2017).

Taken together, these findings suggest that students' positive perceptions of *Idiomatch* were related not only to its technological accessibility but also to the pedagogical features embedded within the application. Interactive practice, immediate feedback, contextualized examples, and flexible access appear to have created a learning environment that supported engagement, independent practice, and confidence in learning English idioms. These findings add to the broader MALL literature by reinforcing the view that the educational value of mobile learning depends less on the technology itself than on how effectively technological features are integrated with sound pedagogical principles and meaningful learning activities (Crompton & Burke, 2020; Rajendran & Yunus, 2021; Stockwell, 2022).

Pedagogical Implications

The findings of this study have several pedagogical implications for English language teaching, particularly in the area of idiom instruction. First, the results suggest that mobile-assisted learning applications, such as *Idiomatch*, can serve as effective supplementary learning resources rather than as replacements for classroom instruction. While conventional teaching remains important for introducing new concepts and facilitating classroom interaction, mobile applications provide learners with additional opportunities to revisit instructional materials, practice independently, and receive immediate feedback outside formal learning hours. Integrating classroom instruction with mobile-assisted practice may therefore create a more flexible and continuous learning environment for English language learners (Crompton & Burke, 2020; Kukulska-Hulme, 2026; Stockwell, 2022).

Second, the findings highlight the importance of incorporating active learning principles into idiom instruction. Traditional approaches frequently emphasize memorizing and translating

isolated expressions, whereas the present study indicates that interactive activities that require repeated retrieval, contextual interpretation, and immediate feedback are more likely to facilitate meaningful learning. Rather than presenting idioms solely as lexical items to be remembered, teachers should encourage learners to interpret idiomatic expressions within authentic communicative contexts and provide opportunities for repeated retrieval through quizzes, matching activities, and contextual practice. Such instructional strategies are consistent with current recommendations for teaching formulaic language and vocabulary development (Chanturia & Sonbul, 2025; Karpicke & Blunt, 2011; Nation, 2022).

The study also offers practical implications for the development of mobile learning applications. The positive responses toward contextual examples, progress monitoring, and interactive feedback suggest that effective language learning applications should be designed based on sound pedagogical principles rather than technological novelty alone. Features such as adaptive practice, personalized feedback, audio pronunciation, and culturally contextualized examples may further enhance students' learning experiences and support different learning preferences. Future mobile applications for language learning should therefore integrate cognitive learning principles with learner-centered design to maximize educational effectiveness (Dichev & Dicheva, 2017; Kaceti & Klímová, 2019; Rajendran & Yunus, 2021).

Finally, the findings provide implications for curriculum developers and teacher education programs. As mobile technology becomes increasingly integrated into higher education, pre-service English teachers should be equipped not only with digital literacy skills but also with the pedagogical competence required to evaluate and integrate mobile learning applications into language instruction. Preparing future teachers to use technology critically and pedagogically will enable them to design learning experiences that are interactive, flexible, and responsive to learners' needs. Consequently, mobile-assisted language learning should be viewed as an integral component of contemporary English language education rather than as an optional instructional supplement (Mishra & Koehler, 2006; Redecker, 2017; Tondeur et al., 2020).

Limitations and Future Directions

Despite the encouraging findings, several limitations should be considered when interpreting the results of this study. First, although *Idiomatch* significantly improved students' idiom comprehension, several participants reported that some idiomatic expressions remained difficult to understand because they reflected cultural concepts that were unfamiliar to Indonesian learners. English idioms are closely associated with the sociocultural background of native speakers, and their meanings often cannot be inferred solely from the literal meanings of the words. While contextual example sentences provided by the application helped reduce this difficulty, future versions of *Idiomatch* could incorporate richer cultural explanations, authentic usage scenarios, or multimedia illustrations to facilitate deeper intercultural understanding (Chanturia & Sonbul, 2025; Grant & Bauer, 2004; Lontas, 2017).

A second limitation concerns the application's instructional features. Although students responded positively to the interactive activities and immediate feedback, *Idiomatch* currently provides a single intermediate-level learning pathway. The absence of adaptive difficulty levels, personalized learning recommendations, pronunciation support, and more advanced progress analytics may limit its ability to accommodate learners with different proficiency levels and learning needs. Future development could integrate adaptive learning technologies and artificial intelligence to provide individualized learning experiences while maintaining the application's pedagogical focus on contextualized idiom learning (Dichev & Dicheva, 2017; Kukulska-Hulme, 2026; Stockwell, 2022).

The findings should also be interpreted within the methodological scope of the present study. The participants were drawn from a single university and represented two intact classes within one English Education program. In addition, the instructional intervention was conducted over a relatively short period of four weeks. Although statistically significant improvements were

observed, these findings should not be generalized to other educational contexts, learner populations, or longer instructional periods without further empirical investigation. Future studies involving multiple institutions, larger and more diverse samples, and longitudinal research designs would provide stronger evidence regarding the long-term effectiveness and broader applicability of mobile-assisted idiom learning.

Despite these limitations, the present study offers meaningful evidence that a pedagogically designed mobile application can support English idiom learning in higher education. Future research may examine the effectiveness of *Idiomatch* across different proficiency levels, educational settings, and learning modalities, and explore the integration of adaptive technologies, culturally responsive instructional materials, and artificial intelligence to enhance personalized language learning experiences.

4. CONCLUSION

This study investigated the effectiveness of the *Idiomatch* application in improving university students' comprehension of English idioms in a mobile-assisted learning environment. The findings demonstrated that students in the experimental group significantly outperformed those receiving conventional instruction, with the independent-samples *t*-test and ANCOVA confirming a statistically significant instructional effect and large effect sizes. These results indicate that integrating gamified mobile learning with contextualized idiom practice can effectively enhance students' understanding of English idiomatic expressions.

The study offers several practical implications. EFL lecturers may integrate mobile applications as complementary learning resources to extend practice beyond classroom instruction. Curriculum designers are encouraged to incorporate technology-supported idiom learning into English language courses, while mobile application developers should prioritize pedagogically meaningful features, such as retrieval practice, contextual examples, and immediate feedback, alongside technological innovation.

Several limitations should be acknowledged. The study involved a relatively small sample from a single university, employed intact classes, and was conducted over a four-week intervention period. In addition, the positive learning outcomes may have been influenced by the novelty of using a new mobile learning application. Therefore, the findings should be interpreted within the context of this study. Future research should involve larger, more diverse samples, include delayed posttests to examine long-term retention, investigate learners at different proficiency levels, and compare *Idiomatch* with other mobile-assisted language learning applications.

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