

Development of the ‘Study Buddy’ Android-Based Application for Teaching Descriptive Vocabulary in Vocational High School

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Abstract

Vocational high school students often struggle with English vocabulary because the available materials focus on general English rather than field-specific technical terminology. To address this gap, this study developed a mobile learning app for descriptive vocabulary tailored to English for Specific Purposes (ESP). This study employed Borg and Gall’s Research and Development (R&D) method, which was adapted and simplified into five stages: research and information gathering, planning, product development, validation and testing, and dissemination. To ensure contextual evaluation, the study involved tenth-grade students in the Mechatronics Engineering program. Data collected through expert validation sheets and student questionnaires which included Likert scales and open-ended feedback were analyzed using descriptive quantitative techniques. Expert validation yielded a feasibility score of 86.25%. Furthermore, the student evaluation achieved a feasibility score of 88.50% in the small-scale trial and 80.50% in the large-scale trial, both of which were categorized as feasible. Students noted that the application was easy to use, engaging, and aligned with their vocational needs. These findings indicate that the application is a viable and practical learning tool to support vocabulary acquisition in vocational English classes.

Keywords: Mobile Learning Media; Vocabulary Learning; ESP

INTRODUCTION

English has become a global language used in various sectors, including education, business, science, and technology (Raja et al., 2022). In Indonesia, English is considered a foreign language, but over time, its role has become increasingly important in educational settings. Alfariy (2021) explained that English plays an important role in Indonesian education, the development of English language instruction stems from the realization that most scientific and technological knowledge is written in English. Therefore, English proficiency is essential to developing and expanding the knowledge of Indonesian students. The inclusion of English lessons in the Indonesian curriculum indicates the crucial role of English for students at all levels in Indonesia, including vocational high schools (SMK). Safira et al. (2022) argued that vocational high school students are considered to be required to equip themselves with English language competency at a certain level to excel in language skills and compete with other graduates.

Among the components of language proficiency, vocabulary mastery plays a fundamental role because it supports the development of all language skills. (Schmitt, 2017, as quoted in Kararbo & Sudibyo, 2022). Mastery of descriptive vocabulary enables students to communicate technical specifications, tools, and workplace-related concepts more effectively in their future professional field. Nababan & Tampubolon (2024) argued that descriptive text can provide a real context for English learners, allowing students to associate new vocabulary with a concrete description of an object. Furthermore, Havwini et al. (2024) explained the four language skills

can be optimally learned when students have sufficient vocabulary knowledge, because it plays a crucial role in building language proficiency.

In the context of vocational high schools, English language instruction is expected to align with students' academic and professional needs through the implementation of ESP. According to (Nurpahmi, 2014) ESP is an approach to English language instruction in which the content and learning objectives are determined by the specific needs of the students. ESP also emphasizes the development of language skills relevant to a particular field of study or occupation rather than focusing on general language proficiency. However, English instruction still relies on materials and approaches adapted from general high schools, resulting limited vocabulary that is relevant to students' vocational specializations. Faisal Aziz & Anjaniputra (2025) explain that one of the obstacles to ESP teaching is the national curriculum, which is still oriented towards General English, alongside the fact that teachers face difficulties in teaching technical content or specific teaching materials due to limited teaching media that are interesting for students, especially engaging teaching media to learn vocabulary.

To address these challenges, the use of interactive learning media has gained increasing attention in educational settings. According to Adam Rahmanto et al. (2023), Interactive learning media refers to the type of digital learning tools that utilizes information and communication technology to facilitate active student engagement during learning activities. It is facilitated by various media that can enhance students' learning experience if designed appropriately. Furthermore, it has been shown to have a positive impact on student learning outcomes (Sujarwo et al., 2022). Therefore, the development of interactive learning media is considered a promising approach to support vocabulary learning in vocational English classrooms. Recent studies have highlighted the potential of digital technology in supporting English language learning. Putra & Anriani (2023) state educators are expected to adapt to the use of learning media and integrate it effectively into classroom instruction. The use of technology can be optimized to create more interactive learning media to assist educators in teaching material more effectively. Furthermore, research conducted by Lestari et al. (2026) shows that technology plays an important role in supporting English language learning, in this study teachers reported that the use of digital devices such as mobile phones, online materials, and videos made lessons more interesting and encouraged active participation.

The integration of mobile apps into language learning is also supported by the concept of Mobile-Assisted Language Learning (MALL). MALL refers to the use of mobile devices to facilitate language learning anywhere and anytime, providing flexibility and accessibility for learners (Kukulska-Hulme, 2020). Mobile applications can support vocabulary learning through features such as repeated exposure, immediate feedback, interactive practice, and self-paced learning, all of which contribute to vocabulary retention and acquisition. Thus, mobile-based learning environments promote student independence and engagement, making them particularly suitable for vocabulary instruction among digital-native students.

One of the prominent technology formats for learning media is mobile applications. Previous studies have demonstrated the potential of mobile application-based learning media in supporting vocabulary learning. Previous research consistently indicates that mobile-assisted learning not only improves students' vocabulary mastery but also increases their engagement and motivation in the learning process. Zakian et al. (2022) reported significant improvements in students' vocabulary knowledge through mobile learning, whereas Polakova & Klimova (2022) found that students expressed high levels of motivation and satisfaction during the learning with mobile applications. Similarly, Arisanti & Zuhdi (2021) demonstrated the

effectiveness of an Android-based vocabulary application in improving vocabulary mastery among elementary school students. These findings suggest that Android-based learning applications can be considered as supporting tools in the vocabulary learning process across different educational contexts.

Despite positive results have been reported in previous studies, significant gaps remain. Most learning materials have been developed for general vocabulary acquisition, targeting elementary and junior high school levels. Although many mobile learning apps have been developed to improve vocabulary mastery, there is still little research on designing Android-based vocabulary learning media specifically for vocational high school students within the ESP (English for Specific Purposes) framework. Furthermore, previous apps generally provide general vocabulary content and rarely integrate descriptive vocabulary directly related to vocational fields and workplace communication. Consequently, the need for mobile learning media that is contextual, vocationally relevant, and ESP-oriented remains largely unmet in current research. This issue aligns with Fadlia et al. (2022), who emphasized that vocational students still have limited access to interactive, learner-centered digital media relevant to their vocational learning context and future professional needs.

The novelty of this study lies in the development of an Android-based learning application specifically designed to integrate ESP-oriented descriptive vocabulary learning for vocational high school students. Unlike previous studies, which primarily focused on general English content, the proposed application incorporates vocabulary and learning activities tailored to the needs of vocational education. Therefore, this study contributes to the limited body of research on ESP-based mobile learning media for vocational English instruction. To bridge this gap, this study aims to develop an Android-based learning application called ‘Study Buddy’ to support descriptive vocabulary learning for tenth-grade vocational high school students. The application integrates interactive learning activities and vocationally relevant content to provide an engaging ESP-oriented learning experience. The study further seeks to evaluate the validity and feasibility of the developed application as an alternative learning medium for vocational English instruction.

METHOD

This study employed a Research and Development (R&D) methodology to design, develop, and evaluate the ‘Study Buddy’ mobile learning application. To accommodate the scope, time limitations, and specific needs of the vocational school context, the ten-stage R&D model proposed by Borg & Gall (1989) was adapted into a simplified five-stage development framework. This modification is conducted to ensure that the development process was appropriate for the objectives and context of the study. The five stages include research and information gathering, planning, product development, validation and testing, and dissemination.

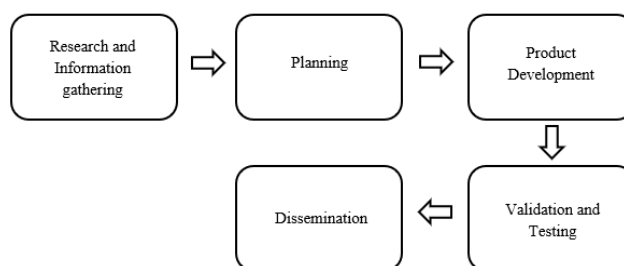


Figure 1. Research and Development Procedure Diagram

The study began with a preliminary needs analysis consisting of classroom observations and an informal written interview. The classroom observations were conducted during the researcher's teaching internship (PKL) at a vocational high school in West Java, Indonesia, specifically in a tenth-grade Mechatronics class. The observations focused on students' participation during English learning activities, vocabulary learning challenges, and the availability of instructional media used in the classroom. To supplement the observational data, the interview was conducted through digital correspondence using several basic open-ended questions related to English teaching practices, vocabulary learning, and the use of learning media in the classroom. The teacher's responses provided additional insights into the existing learning conditions and students' needs for more interactive learning resources in a vocational context. Information obtained from the observations and interviews forms the basis for determining the content and features of the application being developed.

Based on the needs analysis obtained, the planning stage, which began with the design for 'Study Buddy,' began by adapting the material content to align with the 10th-grade vocational high school curriculum. It was planned to focus on more specific descriptive adjectives, with a focus on technical terms describing mechatronic components and machine conditions. Afterward, a rough application design was created, including the main menu display, vocabulary learning display, and quiz display. At this stage, an initial prototype of the 'Study Buddy' application was developed as part of the product development. The development focused on combining interactive visual assets, audio for vocabulary pronunciation, and gamified vocabulary quizzes using trigger features. The application was run using a web APK builder for use on Android-compatible mobile devices.

The developed prototype was evaluated in two stages to ensure its quality. First, the prototype was submitted to two English lecturers from the research institution who acted as supervising lecturers as well as two expert validators, to assess the content accuracy and technical feasibility of the product using an expert validation sheet containing 10 statements using a Likert-based scoring system. The expert validation instrument was developed based on learning media validation criteria proposed by (Laksana, 2024), covering three main aspects: material quality, language appropriateness, and media design. The material quality aspect assessed the relevance, accuracy, and appropriateness of the vocabulary content for vocational students. The language aspect evaluated the clarity, and correctness of language use, while the media design aspect examined interface appearance, navigation, functionality, and overall usability of the application. Following the expert evaluation, revisions were made based on feedback provided through the expert validation sheet.

A small-scale pilot test was then conducted with 10 vocational high school students majoring in mechatronics to demonstrate the application's practicality in classroom settings and real-time learning environments. After receiving feedback from the 10 participants through a questionnaire containing 10 statements with Likert-based scoring and open-ended comments, the product was revised and then tested again on a larger scale with 20 students. At this stage, students completed a comprehensive perception questionnaire that developed by adapting the usability evaluation framework for mobile learning applications proposed by Kumar & Chand (2023) to evaluate the application's overall usability, engagement, layout design, and impact on their learning motivation using the same questionnaire format.

Participants were selected through purposive sampling because they represent the intended users of the application. All participants are tenth-grade students enrolled in the Mechatronics program at the target vocational high school. This program was selected because descriptive vocabulary related to tools, machine components, and technical equipment frequently appears in students' learning activities and future workplace communication. The small-scale trial involved 10 students to identify potential usability issues and gather initial feedback, while the large-scale trial involved 20 students to evaluate the overall feasibility and acceptance of the developed application. In this final stage, the completed version was disseminated locally. The researchers submitted the application file to English teachers at vocational high schools. This ensured that the tool remained accessible and could be used as an alternative learning tool for future tenth-grade Mechatronics classes.

The data obtained was then processed using descriptive quantitative analysis techniques. Quantitative data were obtained from expert validation and student questionnaires, while qualitative data were obtained from open-ended comments and suggestions provided by respondents. Each instrument contained 10 questions that could be scored using a four-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). Quantitative data was analyzed by calculating the total scores obtained from respondents and then converting them into percentages to determine the feasibility of the developed teaching media.

The percentage score was calculated using the formula:

$$P = \frac{\sum X}{N \times S_{max}} \times 100\%$$

where P represents the percentage score, $\sum X$ is the total score obtained, N is the number of respondents, and S_{max} is the maximum possible score.

The results of the presentation were described descriptively to determine the feasibility of the developed product. Quantitative data were interpreted descriptively to determine the feasibility of the developed product. Percentage scores were calculated and then classified according to feasibility criteria adapted from Riduwan (2015), where a score of 81–100% is categorized as “Very Feasible,” 61–80% as “Feasible,” 41–60% as “Quite Feasible,” 21–40% as “Less Feasible,” and 0–20% as “Not Feasible.” A higher percentage indicates a high level of validity and acceptance of the product by users. Furthermore, qualitative data was obtained from open-ended comments provided by respondents, which were then analyzed descriptively to identify strengths, weaknesses, and suggestions that could help further develop the product. These comments are presented as supporting data to improve the final version of the product. Prior to data collection, permission to conduct the research was obtained from the school administration and English teachers of the participating vocational high schools. Participation in the validation and pilot phases was voluntary, and all respondents were informed that the data collected would be used solely for research purposes.

RESULTS AND DISCUSSION

Results

The development of the 'Study Buddy' application generated both quantitative and qualitative data through a modified five-stages Research dan Development (R&D) framework by Borg and

Gall. The development process began with an initial needs analysis through classroom observations during a teaching practicum and informal interviews with an English teacher via online communication. The classroom observations were conducted informally as part of the researcher's teaching internship activities that focused on students' vocabulary learning activities, classroom engagement, and the availability of learning materials. The findings indicated that digital media specifically designed for ESP vocabulary learning were not yet available at the target school. The teacher also confirmed that students had never previously used vocabulary-focused learning apps, as vocabulary activities were largely supported by conventional learning resources. These findings served as the basis for developing an interactive digital learning solution.

In the product planning and design phase, the learning materials were systematically mapped, with a particular focus on technical adjectives (descriptive vocabulary) relevant to the mechatronics engineering major. The software development phase integrated Microsoft PowerPoint with iSpring Suite, which was then compiled into a standalone Android application package (.apk) using Web 2 APK Builder. This structural design phase resulted in an initial prototype of the 'Study Buddy' application, featuring a main menu, contextual vocabulary modules, and a simple interactive practice quiz section. The interface design of this application prototype is illustrated in Figures below:

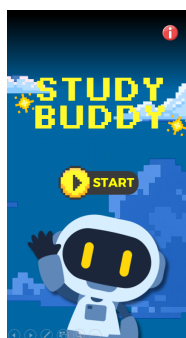


Figure 2. Main Screen Layout

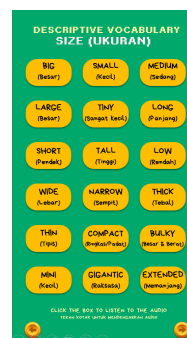


Figure 3. Contextual Vocabulary Module



Figure 4. Explanation and Examples

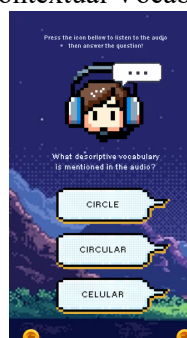


Figure 5. Interactive Quiz Sectionn

The user flow of the Study Buddy app is systematically designed to facilitate students' independent learning from start to finish in each session. The process begins when the user opens the app and accesses the home screen, which displays a "play" button and a "credit information" button. After tapping the "play" button, students are given two options: tap the "learn" button to enter a learning module or the "play" button to proceed to the quiz selection screen. On the vocabulary learning screen, which consists of four different categories, students can tap a specific term to activate the audio pronunciation feature. The next screen then shows how these specific words are used in contextual sentences. Finally, for the assessment phase,

the quiz section offers four types of interactive quizzes that use game-based concepts to evaluate students' mastery of vocabulary independently.

Following the completion of the initial prototype, development continued with product development completion and experts validation. The findings below summarize data systematically collected from validator experts.

Expert Validation Result

Before being tested in class, the 'Study Buddy' application prototype was submitted to English lecturers as the expert validator to review and assess the product's feasibility, including instructional materials, language appropriateness, and technical feasibility. The quantitative evaluation at this stage is presented in Table 1 below:

Table 1. Summary of Feasibility Validation Results

Item	Aspects	Total Score	Maximum Score	Percentage	Feasibility Criteria
Q1	Visual	8	8	100%	Very Feasible
Q2	Visual	8	8	100%	Very Feasible
Q3	Interactiveness	4	8	50%	Quite Feasible
Q4	Interactiveness	7	8	87.5%	Very Feasible
Q5	Interactiveness	8	8	100%	Very Feasible
Q6	Interactiveness	8	8	100%	Very Feasible
Q7	Materials	7	8	87.5%	Very Feasible
Q8	Materials	8	8	100%	Very Feasible
Q9	Materials	4	8	50%	Quite Feasible
Q10	Materials	7	8	87.5%	Very Feasible
Total		69.0	80.0	86.25%	Very Feasible

Based on the quantitative data presented in Table 1, the overall expert validation score was 86.25%. Therefore, referring to the product feasibility criteria, a score above 80% indicates a valid teaching media, technically feasible, and safe for testing in real-time classrooms. However, additional notes included in the expert validation sheet provide feedback from the validators regarding aspects that still need improvement such as Q3 and Q9. First, regarding ease of use, the app's interface and navigation system have been refined to eliminate bugs, ensuring a smoother user experience. Second, to enhance the practice quiz section, additional quiz questions have been integrated into the app to provide students with a wider variety of practice quizzes. Following these specific revisions, the app was thoroughly re-evaluated to ensure both content and design met the required educational standards.

Student Try-Out Results

A student questionnaire was administered to 30 respondents to assess the feasibility and usability of the 'Study Buddy' application. Quantitative data were obtained from a 10-items validation rubric analyzed using descriptive percentage analysis. The conclusions from this item analysis are presented in Table 2 below:

Table 2. Item-by-Item Analysis Summary Student Questionnaire

Item	Total Score	Maximum Score	Percentage	Feasibility Criteria
Q1	100	120	83.33%	Very Feasible

Q2	104	120	86.67%	Very Feasible
Q3	95	120	79.17%	Feasible
Q4	105	120	87.50%	Very Feasible
Q5	101	120	84.17%	Very Feasible
Q6	97	120	80.83%	Feasible
Q7	104	120	86.67%	Very Feasible
Q8	96	120	80.00%	Feasible
Q9	101	120	84.17%	Very Feasible
Q10	95	120	79.17%	Feasible

Quantitative analysis showed a very positive response from students, with all ten items meeting the criteria ranging from “Acceptable” to “Very Acceptable.” The main finding highlighted that the highest percentage was obtained for item Q4, at 87.50%, indicating that the app is easy to use for tenth-grade vocational high school students. Meanwhile, the lowest scores which were still considered good were for items Q3 and Q10, both with the same percentage of 79.17%. This indicates that the provision of illustrative examples and the appropriateness of the material’s difficulty level are adequate for their grade level. Thus, the conclusion is that the students in the test confirmed that the development of this learning medium is highly acceptable and engaging. In addition to the description of the assessment per item, there is a combination of the results of the two testing phases (small scale and large scale) in table 3 below:

Table 3. Summary of Student Responses in Small and Large-Scale Try-Outs

Evaluation Phase	Number of Student (N)	Total Score (Σx)	Max Possible Score	Final Percentage (P)
Small Scale Try-Out	10	354.0	400	88.50%
Large Scale Try-Out	20	644.0	800	80.50%

As depicted in Table 3, the limited small-scale tryout involving ten vocational students yielded an exceptionally high practicality rating of 88.50%, based on an accumulated score of 354 out of 400 points. These results indicate that the target users found the 'Study Buddy' app highly engaging as a teaching tool for vocabulary learning.

Qualitative responses from small- and large-scale trials have been categorized based on the application’s strengths, weaknesses, and recommendations in order to analyze participant feedback more systematically. Regarding the product’s strengths, the qualitative feedback highlights students’ enthusiasm for the mechatronics-specific content and the user-friendly interface. For instance, one student wrote, “*Belajar pakai aplikasi ini membantu saya belajar karena kosakata dan contohnya sesuai dengan apa yang kami pelajari saat praktik jurusan*” (Learning using this app helps me learn because the vocabulary and examples align with what we learned during our departmental internships). Other participants highlighted the app's design, contributing to positive reactions based on user experience. One participant specifically wrote, “*Desain dari aplikasinya sangat membantu saya belajar lebih santai dan sangat seru*” (The app's design really helps me learn more relaxed and is very fun). High levels of enthusiasm

were also evident in the large-scale trial, with the majority of participants expressing high levels of enthusiasm and describing their experience using the vocabulary-learning app as “fun” and “engaging.” This positive feedback indicates that the user-friendly visual layout and effective use of game elements minimize academic anxiety while maintaining high levels of engagement.

On the other hand, despite the positive feedback, some participants identified minor technical issues and offered constructive suggestions for future development. While attempting a simple quiz, a few students mentioned bugs, stating, *“Ada bug di dua soal kuis dan tombolnya agak terlalu kecil”* (There were bugs in two of the quiz questions, and the buttons were a bit too small). Furthermore, participants also provided insightful suggestions regarding the application's user interface and pedagogical functionality. By involving students in both small-scale and large-scale phases, it is recommended to incorporate an automated assessment mechanism. They wrote, *“Saran saya desainnya dibuat lebih menarik lagi dan ada penambahan scoring otomatis di kuisnya”* (My suggestion is to make the design more attractive and add automatic scoring to the quiz). In addition, some students in the large-scale pilot suggested expanding the app's accessibility to iOS devices, as the current prototype is still limited to Android devices.

In response to the participants' evaluation responses, immediate corrective maintenance was performed: the cause of the bugs was debugged, and the button size was scaled up to prevent misclicks. However, due to structural limitations of the development tool used (Microsoft PowerPoint compiled via Web APK Builder), integrating a real-time database for automated scoring was technically unfeasible. To address this limitation without altering the application's lightweight architecture, a comprehensive answer key and self-evaluation section were embedded at the end of the quiz, allowing students to manually verify their scores and assess their vocabulary mastery independently.

Following adjustments at the small-scale level, the optimized test was deployed in the final large-scale tryout with a new group of 20 mechatronics engineering students. This comprehensive evaluation continued with a score of 80.50% based on an accumulated score of 644 out of 800 possible points. Based on the established product feasibility criteria, a value above 80% is recognized as indicating that the developed learning media remains very valid and practical when implemented in the classroom on a large scale. Technical limitations related to automatic assessment and implementation challenges on Android devices were highlighted as key areas for future research and application development, including more accessible updates.

Discussion

The high validation score from expert validators for product feasibility indicates that the 'Study Buddy' app meets academic standards for teaching descriptive vocabulary to tenth-grade vocational high school students. More specifically, this figure demonstrates that, in terms of the essence of the ESP (English for Specific Purposes) material, linguistic accuracy, and technical layout, the app prototype is considered highly valid and safe for testing in a real classroom environment. Furthermore, positive validation results related to the contextual development of the application based on the specific needs of mechatronics students. Several students stated that the vocabulary examples were relevant to the content they encountered during practical activities in their vocational program.

This suggests that contextualized vocabulary instruction can improve students' perceptions of the relevance and usefulness of English for direct communication in their future work environments. These findings directly and strongly support the fundamental concept of English for Specific Purposes (ESP), which states that language instruction achieves its highest utility and relevance when it is precisely tailored to the distinct operational needs of a specific field. By presenting vocabulary that reflects mechatronics tools and workshop scenarios, this app transforms general vocabulary learning into targeted professional preparation. This finding is align with Dewanto et al. (2024) who stated that students will have a more meaningful learning experience if they are provided with learning that is relevant to their major. By incorporating ESP-oriented vocabulary related to their professional context, the Study Buddy application provides a more relevant learning experience than general English learning materials. From the perspective of vocabulary learning theory, vocational students need to build strong semantic networks by learning words in context rather than from isolated lists. They process vocabulary more deeply when they can directly connect new English adjectives to the machines or components they work with during their internships in the department. These findings support the argument of Fadlia et al. (2022) who emphasized the need for more digital learning media specifically designed for ESP environments.

Therefore, unlike common English language learning media, Study Buddy focuses on descriptive vocabulary related to vocational contexts, enabling students to learn vocabulary directly related to their field of study. By providing learning materials relevant to professional contexts aligned with majors, this app can serve as an alternative medium that addresses the shortage of ESP-oriented vocabulary resources for vocational high school students. The students' high level of enthusiasm during the pilot study aligns with MALL theory, which emphasizes that mobile technology can foster student engagement by providing flexible learning opportunities. Thus, delivering this material through a mobile app embodies the core strengths of Mobile-Assisted Language Learning (MALL). Although the feasibility score decreased from 88.50% in the small-scale trial to 80.50% in the large-scale trial, both results remained in the "very feasible" category. This is understandable, as larger trial groups generally yield more diverse perceptions. The decline indicates that more users identified aspects of the app that still need improvement, such as interface design preferences and the lack of an automated rating feature. Nevertheless, the score remained above the feasibility threshold, indicating that the app maintains a high level of practicality across various implementation scales.

One important finding from the item analysis in Table 2 was the high scores obtained in the accessibility and usability aspects of the application. In particular, the high score in item Q4 (87.50%) underscores that the app's user interface is highly intuitive for the target age group. Students reported that while using the application, the interface was easy to understand and operate, which states that the application meets most of the minimal cognitive demands related to navigation and allows students to focus on the mathematics learning task. This finding is important because user-friendly learning media allows students to focus more on the learning material within the application rather than understanding how the application works. In a digital learning environment, ease of use is crucial for an effective learning experience. This structural flow validates the core requirements of the MALL app, where technical accessibility directly determines pedagogical value. Dağdeler (2023) concluded that mobile-enabled vocabulary learning apps are highly effective when they allow users to interact with the material through a simple, accessible, and intuitive interface. On the other hand, items Q3 and Q10 (79.17%) received lower but still acceptable scores; these two items which concern image examples and content level important empirical insights, indicating that while the basic framework is highly

practical, refining the visual references and content assessment could further optimize the vocabulary learning experience. Therefore, positive feedback based on the app's user experience contributes significantly to the overall product's progress.

Many students described this app as fun, engaging, and useful for learning technical vocabulary. This positive attitude focused on the combination of images, audio pronunciations, and simple interactive quizzes. This finding supports the statement by Rahmanto et al. (2023) that interactive media learning supported by information and communication technology can increase learner engagement if tailored to student characteristics. Similar to Sujarwo et al. (2022) who found that interactive media learning positively impacts students' learning outcomes, Polakova & Klimova (2022) reported that mobile learning applications contribute positively to students' motivation and learning satisfaction. However, it is important to emphasize that although these quantitative measures indicate user engagement, motivation, and satisfaction, they do not constitute an empirical measure of actual academic improvement. Since this study did not use an experimental design, these findings reflect the product's acceptable level of acceptance and usefulness rather than a definite improvement in academic achievement.

The positive responses are collected regarding enjoyment and engagement may also be attributed to the gamified quiz features that embedded in the application. Thus, the gamified learning media format creates a more engaging and motivating learning environment, although its direct impact on learning outcomes can vary depending on the context and implementation of the instruction. This perspective helps explain why many students in this study described the application as fun and engaging during vocabulary learning activities. Panmei & Waluyo (2023) found that gamification strategies positively influence student engagement, motivation, and participation in vocabulary learning because students perceived the learning activities as more enjoyable and meaningful.

The findings of this study support the evidence regarding the role of mobile technology in English learning. Students reported that the app made vocabulary learning is encouraged independent vocabulary learning beyond classroom activities. This aligns with Lestari et al.'s (2026) findings that technology-supported learning environments can increase student participation and engagement in learning activities. This is also supported by research by Lei et al. (2022) which highlighted that mobile-assisted language learning has a positive impact on fostering vocabulary learning attitudes and self-regulation capacity in vocabulary learning. Overall, these findings demonstrate that mobile learning apps have multiple functions, not only as supplementary tools but also as effective platforms to support vocabulary learning. Although the data clearly show that this app provides a highly suitable and engaging platform for self-directed learning, it cannot yet be considered a statistically effective tool for improving test scores or long-term memory retention at this stage, as no formal experimental evaluation has been conducted.

Despite the positive aspects, several limitations were identified during implementation. Minor technical issues such as quiz bugs and navigation button size were reported by some students, which were subsequently fixed. However, several user-suggested improvements, including auto-grading and iOS compatibility, could not be implemented due to platform limitations. This limitation is consistent with Duan et al. (2026) who stating that educational app development often faces the challenge of balancing all aspects with low cost. Therefore, future development is recommended to adopt a more sophisticated framework to support features such as auto-grading and cross-platform compatibility.

Overall, the study findings indicate that Study Buddy successfully meets the needs of ESP-oriented digital learning media in vocational education, as evidenced by its feasibility, practicality, and the overwhelmingly positive feedback from students. Since the current research framework is purely a development and validation study aimed at determining feasibility, the actual pedagogical effectiveness of the application still needs to be verified. Future research is recommended to more rigorously test its effectiveness through an experimental design involving more rigorous measurements, namely pre- and post-tests, to assess its impact on vocabulary acquisition and student grades.

CONCLUSION

This study aims to develop a product in the form of an Android-based learning application, Study Buddy, to support the learning of descriptive vocabulary for tenth grade students majoring in mechatronics. (R&D) is used as a research and development model whose stages are modified into five stages. This application was successfully designed, developed, validated and tested in a real classroom environment.

These findings show that the results of the application assessment reached a high level of feasibility and practically across both validation and user trials. Apart from that, students responded positively to the application's contextual ESP content, interactive features, and ease of use. These findings indicate that the Study Buddy application can function as a practical alternative learning media for teaching vocational English. This study suggests that digital learning media optimized with specialized content can effectively bridge the gap in vocational English instruction by providing resources directly tailored to students' professional needs. For educators, this application serves as a flexible, self-directed tool for mastering industry-specific terminology.

However, this study still has several limitations. Structurally, the app is limited to the Android operating system and relies on a lightweight development framework that restricts real-time automatic assessment features. Additionally, because this study focuses strictly on product development and validation, it does not measure actual academic performance or long-term vocabulary retention through an experimental framework. Furthermore, further research is recommended to further test its effectiveness in improving vocabulary mastery through experimental studies and to further improve its technical features.

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