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Article

Augmenting EFL Students' Vocabulary Mastery Using Cake Application

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A B S T R A C T

Vocabulary mastery is a foundational component of English foreign language (EFL) acquisition, yet students frequently struggle with retention, pronunciation, and contextual application due to conventional, rote-learning methods. This study aimed at investigating the implementation of the Cake Application as a Mobile-Assisted Language Learning (MALL) platform to improve the vocabulary mastery of Grade XII Language and Culture (IBB) students at SMAN 9 Kupang, while identifying the pedagogical benefits and operational challenges encountered during the process. Employing a Classroom Action Research (CAR) design based on the Kemmis and McTaggart cyclical model, this study was conducted across two cycles involving 18 participants. Data collection utilized instrument triangulation, integrating quantitative pre-tests and post-tests with qualitative observation sheets, field notes, and semi-structured interviews. The quantitative baseline results from the pre-test indicated low initial lexical proficiency with a class mean score of 43.88, which was below the school's Minimum Mastery Criteria (KKM) of 75. Following the integration of Cake's multimedia short videos and interactive drills, the class mean score advanced to 70.00 in Cycle I, though lingering deficits in spelling and context remained. Refined pedagogical scaffolding and focused spelling tasks in Cycle II successfully propelled the final class mean score to 87.22, with all success criteria fully satisfied. Qualitative findings revealed that despite minor infrastructure-related challenges like network instability and ambient noise, students developed independent error-correction habits and high learning autonomy. In conclusion, the integration of the Cake Application effectively bridges lexical gaps, enhances cognitive retention through visual-auditory input, and establishes a highly motivating, self-directed learning environment for EFL learners.

Keywords: *Cake Application, Classroom Action Research (CAR), Mobile-Assisted Language Learning (MALL), Vocabulary Mastery.*

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INTRODUCTION

Vocabulary serves as a fundamental lexical cornerstone that is inextricably linked to English language proficiency. A robust mastery of vocabulary acts as a vital prerequisite, enabling students to effectively develop and synchronize the four core language competencies: listening, speaking, reading, and writing (Nation, 2022; Webb & Nation, 2020). Within the landscape of English as a Foreign Language (EFL) instruction in Indonesia, Darti & Asmarani (2022) argue that limited lexical resources remain a formidable barrier that impedes students' capacity to decode complex texts, articulate ideas with precision, and engage in meaningful interaction. Although vocabulary plays a vital role, many high school students still face significant difficulties in acquiring it. Factors such as traditional teaching methods that tend to focus on rote memorization of word lists or teacher-centered approaches focusing on explaining meaning, pronunciation, and spelling often result in low motivation and suboptimal memory retention, which affect students' vocabulary mastery (Adam et al., 2021). Students often perceive vocabulary learning as a monotonous activity that is disconnected from its everyday usage, which in turn leads to a reluctance to actively apply new words (Dehghanzadeh et al., 2021). Initial observations at SMAN 9 Kupang indicate that Grade XII

students also experience similar challenges, prompting the exploration of more innovative and student-centered learning strategies.

The rapid development of information technology has brought about a paradigm shift in the world of education, particularly with the emergence of the concept of Mobile-Assisted Language Learning (MALL). Mobile applications offer a promising alternative to overcome the limitations of conventional methods by providing a flexible, accessible, and highly engaging learning experience (Klímová, 2017). A number of studies have shown that the integration of mobile devices and applications in language learning can increase motivation, engagement, learning autonomy, and significantly correlate positively with higher achievement in vocabulary acquisition (Al Shihri et al., 2025; Mahdi, 2018; Mihaylova et al., 2022). Interactive features such as multimedia support (audio/visual), gamification elements, and instant feedback available in these applications are suitable for accommodating diverse learning styles and encouraging independent learning (Daly, 2022).

The CAKE app is a mobile-based English language learning platform that utilizes authentic, short video clips from native speakers. This application offers features designed to improve the effectiveness of learning contextual and realistic English expressions, including bite-sized lessons, interactive quizzes, repetition functions, video subtitles, and Artificial Intelligence (AI)-based pronunciation checks (Suryani et al., 2021). Although CAKE is often evaluated for its effectiveness in improving speaking skills, its role in enhancing vocabulary acquisition remains a significant area of interest. The app's potential to improve vocabulary mastery is also substantial. This is due to its focus on contextual learning, systematic repetition, and the ability of students to save and review new words and phrases (Octavianita et al., 2022). Therefore, CAKE's function to create a dynamic and personalized learning environment is believed to be a solution to help the students of SMAN 9 Kupang to master vocabulary.

Empirical evidence from recent studies highlights the effectiveness of mobile-assisted language learning (MALL) applications, including the Cake application, in promoting English vocabulary acquisition across diverse educational contexts. Sari & Wahyudin (2020) reported that the Cake application effectively improved students' vocabulary mastery by providing engaging and interactive learning activities. Similarly, Sudwintari et al. (2023) found that the application enhanced vocabulary learning in online classroom settings through multimedia features and classroom action research implementation. In addition, Hamzah et al. (2024) demonstrated that the Cake application significantly improved students' speaking performance by providing authentic audiovisual input and interactive learning opportunities. The role of mobile technology in supporting vocabulary learning is further supported by Chen & Huang (2023), who found that theory-based mobile applications significantly enhanced learners' vocabulary achievement and long-term retention. Likewise, Al Shihri et al. (2025) concluded that integrating multiple MALL applications positively influenced EFL learners' academic vocabulary acquisition. Previous reviews have also consistently shown that mobile applications contribute positively to vocabulary development by increasing learner engagement, autonomy, and learning flexibility(Klímová, 2017; Mahdi, 2018). Collectively, these findings suggest that the Cake application represents a promising instructional tool for bridging the gap between receptive vocabulary knowledge and productive vocabulary use in EFL contexts. Given the persistent vocabulary acquisition difficulties experienced by Indonesian senior high school students (Adam et al., 2021; Darti & Asmarani, 2022; Dehghanzadeh et al., 2021) and the demonstrated potential of MALL applications, this study aims to investigate the effectiveness of the Cake application in improving the vocabulary acquisition of twelfth-grade students at SMAN 9 Kupang. The findings are expected to provide empirical evidence supporting the integration of technology-based instructional media into English language teaching, particularly in Indonesian EFL classrooms.

METHOD

The research employs Classroom Action Research (CAR) aimed to augment the quality of vocabulary learning for Grade XII IBB students at SMAN 9 Kupang through the use of the Cake application. CAR is chosen because of its reflective and structured nature, focusing on direct efforts to improve learning practices and create a more conducive learning environment, including adjustments to classroom management through the integration of digital media. In its implementation, the main principle of CAR is emphasized, namely that all research activities must be carried out without disrupting the teaching and learning process or the teacher's routine teaching tasks. The model used is Kemmis & McTaggart (1988) continuous spiral model, which requires research to be conducted in at least two cycles, with each cycle covering four essential stages: planning, action implementation, observation, and reflection.

Participants

The participants of the study are Grade XII Language and Cultural (IBB) students at the school, with age between 16 to 18 years old. The selection of location and timing is carried out in accordance with the principles of Classroom Action Research (CAR), namely by scheduling research activities to coincide with normal class hours and not interfere with the teaching and learning process. The Grade XII Language and Cultural (IBB) students are chosen because they face the greatest challenges in achieving the minimum mastery criteria for English vocabulary mastery, based on the report data from the English teacher.

Instruments

To ensure the validity and reliability of the findings, this study employed instrument triangulation by combining quantitative and qualitative measurements. Quantitatively, a learning outcome test consisting of a pre-test and a post-test was used in each cycle. This test specifically evaluated students' vocabulary mastery in terms of meaning, usage in sentence context, and spelling/word recognition, aspects strongly supported by the Cake app's audiovisual features. For qualitative data, three main instruments were used to capture a comprehensive view of classroom dynamics. First, a multilevel checklist-style observation sheet was used to specifically measure student engagement, activity, and interaction with Cake's features. Second, semi-structured interviews were conducted with selected participants to extract deeper narrative insights into their learning experiences, operational difficulties, and personal impressions. All of this qualitative data is crucial for reflection and adjustment of actions in subsequent research cycles.

Procedures

During the action, the observation stage was carried out simultaneously by peer observers, who were tasked with filling out observation sheets to systematically record students' activities, engagement, and interactions with Cake's features as process data, as well as making field notes to document technical obstacles and unexpected student behaviors. At the end of this stage, a post-test was administered to measure learning outcomes after the intervention. Finally, the reflection stage involved a critical analysis of both quantitative data (post-test scores) and qualitative data (observation sheets, field notes, and interviews) to evaluate the success of the cycle and determine necessary adjustments for the subsequent research cycle

Data Analysis

Data analysis in this study used a combination of quantitative and qualitative methods. Quantitative analysis focused exclusively on learning outcomes, using the mean scores of pre-tests and post-tests and the percentage of classical mastery to compare results between cycles and determine the achievement of the minimum mastery criterion. Meanwhile, qualitative analysis was applied to process data gathered from observation sheets, field notes, and semi-structured interviews. This qualitative analysis involved reducing, condensing, and presenting narrative data to systematically describe the quality of students' interactions with

Cake's features, their personal learning experiences, and the operational obstacles encountered during the implementation of the action. All findings from both types of analysis were then integrated in the reflection stage to critically evaluate the success of the action and formulate specific improvement steps for the next research cycle.

FINDINGS AND DISCUSSION

To establish an empirical baseline regarding the participants' initial lexical proficiency, a pre-test was administered prior to the deployment of the Cake application. This diagnostic instrument was meticulously structured to evaluate students' receptive and productive vocabulary capacities across three core domains: spelling, meaning, and contextual use. The assessment comprised a total of 10 test items, which were strategically distributed to measure these distinct dimensions of vocabulary mastery. The spelling section consisted of 2 items designed to evaluate the students' orthographic accuracy and their ability to correctly arrange letters to form target words. The semantic domain was assessed through 4 meaning-based items that tested comprehension by requiring students to identify definitions, synonyms, or accurate translations of the lexis. Lastly, the contextual use component, which comprised 4 items, measured productive linguistic competence by requiring participants to accurately integrate the newly acquired words into appropriate grammatical structures and real-life situational sentences.

A cohort of 18 students from the Grade XII Language and Culture (IBB) class underwent this preliminary assessment, which aimed to isolate specific lexical deficits and gauge baseline performance before the pedagogical intervention. Regarding the evaluation metric, the instrument utilized a dichotomous scoring framework, wherein each correct response was assigned a value of 10 points, while incorrect answers received a null score of 0, yielding a maximum possible score of 100. The datasets yielded from this diagnostic phase functioned as the primary benchmark against which the trajectory and magnitude of vocabulary improvement were measured during the subsequent action research cycles. Accordingly, the granular distribution of the students' pre-test performances is systematically delineated in Table 1.

Table 1. The Results of Students' Pre-Test

Students	Spelling	Meaning	Contextual use	Total score	Criteria
1	10	0	0	10	Poor
2	10	20	10	40	Poor
3	20	10	10	40	Poor
4	20	40	30	90	Excellent
5	20	10	0	30	Poor
6	20	30	30	80	Excellent
7	20	20	20	60	Fair
8	20	30	10	60	Fair
9	0	10	0	10	Poor
10	10	20	20	50	Poor
11	10	10	10	30	Poor
12	10	20	0	30	Poor
13	10	10	0	20	Poor
14	20	20	10	50	Poor
15	20	40	30	90	Excellent
16	20	10	0	30	Poor
17	0	10	20	30	Poor
18	20	0	20	40	Poor
Total score	260	310	220	790	
Mean	14.44	17.22	12.22	43.88	

The empirical data obtained from the pre-test reflects the students' baseline vocabulary mastery prior to the pedagogical intervention utilizing the Cake application. Globally, the diagnostic results indicate that the Grade XII Language and Culture (IBB) students experienced profound difficulties in English lexical acquisition, as evidenced by an overall

mean score of only 43.88. This cumulative baseline falls substantially short of the school's Minimum Mastery Criteria (KKM), which requires a passing standard of 75. Individual performances also exhibited wide disparity: while a few students scored as high as 90, others achieved a critically low score of 10. This wide distribution demonstrates an uneven initial proficiency level and underscores an urgent need for a more structured, technology-mediated instructional approach to reinforce their vocabulary foundation toward the established benchmark.

A comparative analysis of the three core vocabulary dimensions reveals specific areas of linguistic strength and vulnerability among the 18 participants. Among the evaluated components, the meaning aspect recorded the highest achievement, yielding a mean score of 17.22. This indicates that the students possessed a relatively better capacity for semantic comprehension such as identifying definitions, synonyms, or translations compared to other technical dimensions of vocabulary.

Conversely, the students' productive linguistic competence was heavily constrained. The contextual use aspect recorded the lowest mean score at 12.22, marking it as the most critical area of deficiency for the students. This low baseline indicates that the participants faced severe challenges in integrating newly acquired words accurately into appropriate grammatical structures and real-life situational sentences. Meanwhile, the spelling aspect positioned itself in the middle tier, securing a mean score of 14.44, which highlights moderate difficulties in orthographic accuracy and letter arrangement.

In conclusion, the descriptive statistics substantiate that while semantic recognition (meaning) was marginally more developed, contextual application (use) remained the weakest dimension. These findings validate that traditional vocabulary memorization had been insufficient to propel students toward the required KKM score of 75, thereby justifying the implementation of the Cake application to bridge these specific lexical gaps in the subsequent research cycles.

The Implementation of Cycle I

The execution of Cycle I followed the procedural framework of Classroom Action Research (CAR), encompassing four systematic stages: planning, action, observation, and reflection. This cycle lasted for 1 week with two classroom meetings, using the following steps.

Planning

In the planning phase, the researcher formulated a comprehensive Lesson Plan (RPP) that integrated the Cake application as the primary instructional medium. In accordance with the methodology delineated in Chapter III, instructional materials were curated from the application's multimedia library, focusing on authentic video dialogues relevant to the Grade XII curriculum. The researcher also prepared the necessary research instruments, including observation sheets to document student-teacher interactions and a semi-structured interview guide to capture qualitative insights. Furthermore, a Post-Test I instrument was designed to evaluate the three dimensions of vocabulary mastery: spelling, meaning, and contextual use.

Action

The pedagogical intervention was executed through a structured instructional sequence divided into three distinct stages:

Pre-Teaching Stage (10 minutes): The session commenced with formal greetings, a collective prayer, and attendance verification. To establish a digitally conducive learning atmosphere, a brief ice-breaking activity was conducted. The researcher then explicitly articulated the learning objectives and introduced the concept of Mobile-Assisted Language Learning (MALL), explaining how the specific features of the Cake application would be utilized to facilitate their lexical acquisition.

While-Teaching Stage (75 minutes): Consistent with the instructional design, the researcher implemented the following steps:

Modeling: The researcher demonstrated the navigation of the Cake application, specifically highlighting the video expression and interactive features. Students observed native speaker videos while the researcher explained how the subtitles and key expressions aided in deciphering word meanings within a real-world context.

Joint Construction: Students were organized into pairs to engage with specific multimedia clips. They discussed the meaning and usage of new lexis while practicing word structures through the application's interactive tasks. The researcher circulated to facilitate the process and address technical impediments, such as network stability.

Independent Construction: Students individually completed target learning missions within the application. They engaged with the speaking and listening practices to meet the app's accuracy thresholds. This stage enabled students to receive immediate, objective feedback, fostering an autonomous and self-directed learning environment.

Post-Teaching Stage (15 minutes): The session concluded with a synthesis of the core vocabulary acquired. Students were encouraged to reflect on their learning experience and pose questions regarding the materials. The researcher provided constructive feedback on common errors identified during the session before closing with a prayer and dismissal.

Observation and Reflection

The observation phase, conducted using structured observation sheets, revealed that the 18 students exhibited high levels of engagement. The gamified nature of the Cake application, particularly its interactive scoring feedback, significantly augmented student motivation. Most participants demonstrated increased confidence in engaging with authentic digital materials compared to the pre-test stage.

In the reflection phase, the researcher synthesized the quantitative results from Post-Test I with the qualitative data derived from the observations and interviews. The evaluation provided critical diagnostic insights; students reported that the authentic video content was substantially more engaging than traditional textbooks. However, despite the visible increase in student enthusiasm and a positive upward trend in the class mean score to 70.00, the success criteria were not fully satisfied within this cycle, as the performance still fell short of the school's Minimum Mastery Criteria (KKM) threshold of 75. The triangular analysis revealed persistent weaknesses in orthographic accuracy (spelling) and situational sentence integration (contextual use). Consequently, the researcher concluded that further pedagogical refinement was imperative, thereby requiring the study to proceed to Cycle II with a revised strategy. Detailed statistical outcomes are presented in Table 4.2: Post-Test I Results.

The improvement in students' vocabulary proficiency following the implementation of the Cake app in Cycle I is presented in detail in the following table. This data includes individual scores, a comparison of scores against the minimum passing score, and the calculation of the class average, which serves as an indicator of the intervention's success in that cycle.

Table 2. Students' Post Test I Results

Students	Spelling	Meaning	Contextual use	Total score	Criteria
1	10	30	20	60	Fair
2	20	20	30	70	Good
3	20	20	20	60	Fair
4	10	30	50	90	Excellent
5	20	20	30	70	Good
6	20	30	50	100	Excellent
7	20	10	40	70	Good
8	20	20	30	70	Good
9	10	20	20	50	Poor
10	20	30	20	70	Good
11	20	20	20	60	Fair
12	20	30	50	100	Excellent
13	10	20	30	60	Fair
14	10	10	50	70	Good

15	20	30	50	100	Excellent
16	20	20	20	60	Fair
17	20	10	20	50	Poor
18	10	20	20	50	Poor
Total score	310	390	530	1.260	
Mean	17.22	21.66	29.44	70.00	

The post-test for Cycle I was administered to evaluate the enhancement of students' vocabulary mastery following the pedagogical intervention utilizing the Cake application. This post-test instrument comprised a total of 10 items, which were strategically distributed across three core dimensions: 2 items for spelling, 3 items for meaning, and 5 items for contextual use. Similar to the baseline assessment, a dichotomous grading system was applied, where each correct answer was awarded 10 points and incorrect responses received 0 points, yielding a maximum potential score of 100. Based on the quantitative data presented in Table 4.2, the results indicate a noticeable improvement in students' lexical competence. Within the score distribution, the highest score achieved was 100, which was obtained by three students, namely S6, S12, and S15, indicating excellent mastery of the target vocabulary. Conversely, the lowest score recorded was 50, achieved by three participants, namely S9, S17, and S18, which remains notably higher than the lowest baseline score of 10 recorded in the pre-test. A granular, aspect-by-aspect comparative analysis reveals uneven progression among the three evaluated linguistic strands relative to the number of test items allocated. Among the components, the contextual use aspect, which comprised 5 items, recorded the highest cumulative achievement, securing a total score of 530 and a mean score of 29.44.

This significant spike from its initial pre-test baseline of 220 (mean of 12.22) indicates that the short video drills and practical daily expressions in the Cake application were highly effective in expanding the students' capacity to recognize how target words fit into communicative structures. In contrast, the students' orthographic development was less pronounced. The spelling aspect, consisting of 2 items, recorded the lowest cumulative performance with a total score of 310 and a mean score of 17.22. Although this reflects an upward movement from the pre-test total of 260, it marks precise letter arrangement and orthographic accuracy as the most persistent areas of technical difficulty for the participants. Meanwhile, the meaning aspect, which evaluated semantic comprehension across 3 test items, positioned itself in the middle tier by achieving a cumulative score of 390 and a mean score of 21.66 , showing a steady growth from its pre-test baseline of 310.

The implementation of Mobile-Assisted Language Learning (MALL) through the Cake application clearly exerted a positive upward trend on the classroom's overall performance. The total score accumulated by the 18 students rose significantly to 1.260, which successfully propelled the overall class mean score from 43.88 in the pre-test up to 70.00 in the post-test. Despite this positive shift, the current results cannot be categorized as completely satisfactory. Given that the newly achieved class mean score of 70.00 still falls short of the school's established Minimum Mastery Criteria (KKM), which mandates a passing standard of 75, the success indicators of this study were not fully met in the first iteration.

The empirical data reveals that despite substantial progress in contextual recognition, the students still require deeper reinforcement to bridge the remaining gaps in semantic retention (meaning) and orthographic precision (spelling). Consequently, to effectively address these lingering pedagogical challenges and push the class average score beyond the required threshold, the researcher decided that the action research must proceed to Cycle II with a refined instructional strategy.

The Implementation of Cycle II

Recognizing that the success indicators had not been fully satisfied in the first iteration, the researcher proceeded to Cycle II. The primary objective of this cycle was to rectify the lingering pedagogical deficiencies identified in Cycle I, specifically focusing on reinforcing students' orthographic precision (spelling) and situational sentence integration (contextual use). This cycle strictly adhered to the established Classroom Action Research (CAR) cyclical

framework, consisting of planning, action, observation, and reflection. This cycle lasted for 1 week with two classroom meetings, using the following steps.

Revised Planning

In the planning phase of Cycle II, the researcher conducted a strategic revision of the previous Lesson Plan (RPP) based on the diagnostic insights gained from the Cycle I reflection. To target the low performance in spelling, the researcher designed focused orthographic drills incorporating the spelling-review features within the Cake application. To address the critical deficit in contextual usage, the researcher developed more explicit scaffolding tasks. These tasks required students to active-bridge the application's digital expressions into written and spoken situational sentences. Furthermore, the observation sheets were refined to track students' structural engagement more closely, and a Post-Test II instrument was constructed to reassess the three core lexical dimensions.

Action

The modified pedagogical intervention was executed over a structured instructional sequence, optimized to maximize student interaction with the target vocabulary features:

Pre-Teaching Stage (10 minutes): The class commenced with standard classroom routines, including greetings, a collective prayer, and attendance registration. The researcher conducted a targeted review of the lexical items introduced in Cycle I, drawing immediate connections to the day's advanced learning goals. The learning objectives for this cycle were explicitly highlighted, emphasizing the active production of vocabulary rather than passive recognition.

While-Teaching Stage (75 minutes): The researcher modified the implementation of the three core instructional steps as follows:

Modeling: The researcher explicitly demonstrated how to utilize the advanced review and quiz functions within the Cake application to practice correct spelling. Additionally, the researcher modeled how to dissect the app's "Key Expressions" and transform them into alternative, real-life situational sentences, highlighting specific grammatical constraints.

Point Construction: Students worked in pairs to complete structured vocabulary worksheets based on selected video clips in the application. They were directed to co-construct complex sentences using the newly acquired lexis and cross-verify their spellings with their partners. The researcher provided intensive scaffolding, prioritizing pairs that exhibited severe structural difficulties during Cycle I.

Independent Construction: Working individually, students completed the adaptive speaking and vocabulary missions within the Cake application. To push past previous limitations, students were required to complete specific sentence-building tasks and achieve high accuracy scores on the app's AI feedback system before submitting their individual progress.

Post-Teaching Stage (15 minutes): The session concluded with students presenting their constructed sentences to the class. The researcher provided systematic, direct corrective feedback on orthographic patterns and contextual vocabulary placement. The session closed with a brief synthesis of the learning journey, a reflective prayer, and formal dismissal.

Observation and Reflection

The observation phase indicated a highly positive transformation in the classroom environment. The introduction of focused spelling tasks and sentence scaffolding noticeably stabilized student accuracy. The 18 participants displayed an increased level of autonomy, seamlessly navigating the application's review functions to self-correct their typographical errors. Peer collaboration during the joint construction stage also proved more effective in lowering linguistic anxiety.

In the reflection phase, the researcher cross-analyzed the qualitative observation data with the definitive quantitative findings from Post-Test II. The triangular evaluation substantiated that the strategic modifications implemented in Cycle II successfully resolved

the previous instructional bottlenecks. The students demonstrated a robust, comprehensive proficiency across all three evaluated dimensions. Because the class mean score rose optimally to 87.22, successfully surpassing the school's Minimum Mastery Criteria (KKM) threshold of 75, and since individual achievements stabilized satisfactorily, the researcher concluded that the predetermined success indicators had been completely satisfied. Therefore, the action research process was officially terminated at the conclusion of this cycle.

Table 3. Students' Post Test II Results

Students	Spelling	Meaning	Contextual use	Total score	Criteria
1	20	40	40	100	Excellent
2	20	40	40	100	Excellent
3	10	30	40	80	Excellent
4	20	40	30	90	Excellent
5	20	40	30	90	Excellent
6	20	30	40	80	Excellent
7	20	40	40	100	Excellent
8	20	30	30	80	Excellent
9	20	40	20	80	Excellent
10	20	40	40	100	Excellent
11	20	40	40	100	Excellent
12	10	40	30	80	Excellent
13	20	30	40	90	Excellent
14	10	40	20	70	Good
15	20	40	30	90	Excellent
16	10	40	30	80	Excellent
17	20	30	20	70	Good
18	20	30	40	90	Excellent
Total score	320	660	600	1570	
Mean	17.77	36.66	33.33	87.22	

The post-test for Cycle II was administered to evaluate further improvement in students' vocabulary mastery following the refined pedagogical interventions using the Cake application. This summative instrument maintained an identical structure to the previous tests, comprising a total of 10 items strategically distributed across three core dimensions: 2 items for spelling, 3 items for meaning, and 5 items for contextual use. A dichotomous scoring framework was consistently applied, in which each correct response was assigned 10 points and incorrect responses received 0 points, yielding a maximum potential score of 100.

Based on the empirical data presented in Table 4.3, the quantitative results indicate a substantial and comprehensive escalation in the students' lexical competence. Within the individual score distribution, a remarkable paradigm shift was observed: five students, namely S1, S2, S7, S10, and S11, achieved a perfect score of 100, demonstrating a flawless command of the target vocabulary. Conversely, the lowest score recorded in this cycle rose significantly to 70, achieved by two participants (S14 and S17). This baseline is notably higher than the lowest score of Post-Test I (50) and represents a massive improvement from the critical low score of 10 observed during the pre-test phase.

A granular, aspect-by-aspect analysis demonstrates a more balanced and robust progression across all evaluated linguistic strands during this second cycle. Among the components, the meaning aspect attained the highest achievement, securing a total score of 660 and a computed mean score of 36.66. This outstanding achievement signifies that the continuous integration of interactive video drills and digital flashcards within the Cake application successfully solidified the students' semantic comprehension and long-term word retention.

Concurrently, the students' productive linguistic competence exhibited a profound development; the contextual use aspect achieved a total score of 600 with a mean score of 33.33. This sharp upward trend from the previous cycles confirms that the targeted contextual missions and adaptive sentence building exercises effectively resolved the participants'

lingering difficulties in syntax integration. Meanwhile, the spelling aspect positioned itself steadily, securing a total score of 320 and a mean score of 17.77, which indicates that orthographic precision had become well-stabilized across the cohort.

The strategic pedagogical adjustments implemented in Cycle II successfully propelled the entire classroom's academic trajectory. The cumulative score accumulated by the 18 participants reached an optimal high of 1.570, which successfully hoisted the overall class mean score to 87.22.

In sharp contrast to the previous iterations, these final outcomes can be categorized as highly satisfactory and complete. Given that the newly established class mean score of 87.22 substantially surpasses the school's Minimum Mastery Criteria (KKM) passing standard of 75, and considering that the vast majority of individual students successfully crossed the threshold, the predetermined success indicators of this classroom action research were fully satisfied. The empirical evidence confirms that the integration of Mobile-Assisted Language Learning (MALL) via the Cake application effectively bridged the initial lexical gaps, optimized vocabulary retention, and fostered an independent learning environment. Consequently, since the pedagogical objectives had been thoroughly accomplished, the researcher officially concluded the study, rendering further research cycles unnecessary.

The Challenges and Benefits of Integrating the Cake Application into Vocabulary Teaching.

Based on the triangulation of classroom observations and semi-structured interview sessions, the primary operational challenges encountered during the implementation revolved around technical instability and infrastructure limitations at the school. The qualitative data revealed that network coverage inside the classroom was frequently unstable, causing intermittent application lagging and prolonged loading times. These infrastructure bottlenecks posed a direct threat to the students' cognitive concentration during high-engagement tasks, such as video parsing or interactive quiz progression. Student 1 explicitly reported that these technical disruptions abruptly halted the learning flow, occasionally forcing them to restart tasks from the beginning, which induced temporary frustration. Similarly, Student 2 emphasized that right when they were highly focused on analysing lexical units within a video clip, unexpected buffering screens scattered their learning focus and diminished their instructional momentum.

In addition to connectivity constraints, ambient classroom noise and the strictness of the digital interactive environment presented significant behavioural and audio-perceptual hurdles. During the independent construction phase, the classroom atmosphere occasionally became noisy due to simultaneous oral input and digital audio playback from multiple devices. This ambient sound interference made it highly difficult for the participants to catch the subtle orthographic cues and pronunciation nuances unless they utilized earphones. Furthermore, the objective evaluation system embedded within the app initially induced a brief drop in confidence and heightened anxiety among the learners. Students frequently expressed initial confusion when the digital assessment metrics yielded lower evaluations than expected despite their perceived correctness. This situational impediment required immediate teacher intervention, wherein the researcher had to provide technical scaffolding, re-demonstrate operational steps on the screen, and write corrective orthographic feedback on the whiteboard to lower the students' linguistic anxiety.

Despite the initial operational friction, these technical hurdles were successfully mitigated through adaptive, independent problem-solving strategies developed by the students themselves. Rather than becoming trapped in prolonged frustration when the application yielded a lower performance score, the learners proactively cultivated autonomous coping mechanisms. Student 3 shared that their strategy when facing such confusing evaluations was to actively utilize the application's built-in playback feature to listen to their own recorded responses side by side with the native speaker's model, allowing them to systematically conduct self-corrections. Furthermore, to maintain acoustic clarity amidst the classroom noise, the students took the initiative to utilize earphones and patiently

repeated the targeted tasks until the application registered a green passing indicator. This transition from anxiety to proactive adjustment proved that while technical barriers were present, they ultimately served as a pedagogical catalyst that pushed the Grade XII Language and Culture (IBB) students to develop resilient digital literacy and independent error-correction habits.

Conversely, the integration of the Cake application yielded profound pedagogical benefits, primarily by transforming passive vocabulary learning into an active, multimodal experience. Compared to traditional textbooks, which Student 2 described as static, passive, repetitive, and boring, the application provided direct, contextualized video representations that explicitly clarified situational contexts. Through authentic short videos, movie clips, and daily vlogs, the participants successfully mapped word meanings directly onto real-world interactions, absorbing crucial non-verbal elements such as the speakers' facial expressions and intonations. This multimedia input significantly enhanced long-term cognitive retention, making new vocabulary much easier to memorize and deeply comprehend. Student 1 reinforced this by stating that the short videos and interactive subtitles were highly effective in helping them master daily conversational expressions because they could observe exactly how those target words functioned in situ.

Beyond cognitive and lexical expansion, the digital intervention successfully cultivated strong learning autonomy and sustained intrinsic motivation both inside and outside the classroom. The gamified nature of the application, complemented by instant feedback systems like red or green performance indicators, converted potentially stressful assessments into a highly engaging, competitive classroom dynamic. This system drove the students to practice repeatedly without the fear of peer judgment, effectively lowering their affective filter. Concurrently, the continuous use of the app fostered sustainable independent study routines. Student 1 noted a substantial expansion in their functional vocabulary repository, particularly for expressions used in daily interactions, which prompted a firm plan to continue using the application autonomously at home. This commitment to long-term language acquisition was echoed by Student 3, who asserted that their retention of newly acquired lexical units had become significantly stronger, leading them to permanently incorporate the Cake application into their home study routine as an effective tool to prevent learning boredom.

Discussion

This study aimed to examine the improvement of grade XII students' vocabulary mastery through the implementation of the Cake application and to identify the benefits and challenges encountered during the learning process. The findings indicated that the integration of the Cake application significantly enhanced students' lexical acquisition, particularly in orthographic precision (spelling), semantic comprehension (meaning), and contextual usage, despite several technical impediments identified during the implementation.

The quantitative findings revealed a substantial improvement in students' vocabulary mastery following the application of Cake. The mean score advanced from 43.88 in the pre-test to 70.00 in the post-test. This progression suggested that incorporating Mobile-Assisted Language Learning (MALL) into vocabulary instruction facilitated more effective retention and understanding of lexis. These results were consistent with recent research by Kohnke (2020), which demonstrated that gamified mobile applications effectively bolstered lexical acquisition by providing repetitive yet stimulating exposure to target vocabulary for Gen Z learners. Furthermore, this quantitative surge strongly corroborated the previous findings by Sari & Wahyudin (2020), whose experimental study likewise demonstrated that the short-form video content and repetitive drilling features within the Cake application were highly instrumental in reinforcing students' lexical retention compared to traditional instructional methods.

Furthermore, the Cake application fostered higher vocabulary retention compared to conventional methods because learners processed meaning through authentic visual and auditory input. Mobile technology supports contextualized vocabulary use by allowing

learners to observe native speakers in real-world scenarios. This was evident in the app's video features, where verbal input was reinforced by visual cues, resulting in more durable memory representations. This pedagogical advantage directly aligned with the empirical evidence provided by Mohamed & Al-Jadaan (2024), who concluded that the combination of auditory and visual stimuli within multimodal platforms facilitated a significantly deeper understanding of nuanced meanings than textbook-based learning. When instruction was embedded in meaningful multimedia interaction, learners demonstrated improved recall and greater fluency. This process triggered what Renaldy (2025) highlighted as the "deep processing" of lexis, an essential cognitive mechanism that effectively helped the Grade XII students of SMAN 9 Kupang build a more robust vocabulary repository for their advanced linguistic needs.

In addition to cognitive gains, the Cake application created a highly motivating and autonomous learning environment. The observation and interview data, where the vast majority of students exhibited high engagement, confirmed that the app-based instructional framework mitigated learning boredom and decreased linguistic anxiety. Language learning applications provide a "private" learning space that encourages active participation, especially among students who are typically passive in formal settings. This motivational enhancement suggests that interactive quizzes and gamified features can significantly boost students' intrinsic motivation during vocabulary learning. Furthermore, the non-threatening digital environment offered by the app expanded the students' lexical boundaries, reinforcing the claims made by Alqarni (2024) that mobile-assisted tools successfully reduced the vocabulary gap in EFL classrooms and allowed learners to gain a more diverse range of vocabulary compared to those restricted to conventional classrooms.

Despite these benefits, the study identified challenges such as technical instability, network limitations, and temporary application lagging. Some students initially felt frustrated when the application buffered or experienced prolonged loading times inside the classroom, which temporarily scattered their focus. Such difficulties were common in MALL contexts; for instance, Read (2022) found that technical limitations and ambient noise could occasionally disrupt concentration. These operational bottlenecks were also highlighted in a study by Sudwintari et al. (2023); however, while their research was situated in a fully online framework, the current study demonstrated that these digital barriers could be successfully navigated during face-to-face learning through intensive teacher scaffolding. As the students of SMAN 9 Kupang became more familiar with the user interface and effectively utilized earphones, these challenges gradually diminished. The teacher's role in providing immediate technical guidance and writing corrective feedback on the whiteboard remained crucial in helping students overcome these structural barriers.

In conclusion, while minor technical hurdles were present, they were heavily outweighed by the significant improvements in vocabulary mastery. The findings proved that the Cake application was an effective pedagogical tool that not only improved vocabulary acquisition across spelling, meaning, and contextual usage but also fostered a positive, autonomous learning environment for EFL learners at SMAN 9 Kupang.

CONCLUSIONS

This study found that the Cake application effectively improved the vocabulary mastery of twelfth-grade students at a senior high school. Students' mean scores increased significantly from 43.88 in the pre-test to 70.00 in the post-test, indicating that integrating Mobile-Assisted Language Learning (MALL) into vocabulary instruction enhanced vocabulary acquisition and retention. Although students initially experienced challenges, including technical instability, high AI sensitivity in pronunciation assessment, and hesitation in using the voice-recording feature, these difficulties gradually diminished as they became familiar with the application. The AI-generated instant feedback encouraged students to identify pronunciation errors independently, improve their speaking confidence, and monitor their learning progress. Teacher guidance also played an important role in helping students overcome technical barriers and remain focused on learning objectives. Overall, the Cake application created an engaging, motivating, and autonomous learning environment. The high level of student engagement

and their willingness to continue using the application independently suggest that Cake is an effective supplementary tool for vocabulary instruction and for promoting long-term autonomous English language learning among EFL students.

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