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DEVELOPMENT OF A ROBLOX-BASED INTERACTIVE GAME FOR ARABIC VOCABULARY LEARNING IN ISLAMIC SENIOR HIGH SCHOOLS

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ABSTRACT

Arabic vocabulary mastery is essential for language proficiency, yet many Islamic senior high school students still struggle with conventional memorization-based instruction. Although immersive game-based learning has gained attention, empirical studies on Roblox for Arabic vocabulary instruction remain scarce, particularly in formal Islamic senior high schools. This study aimed to develop and evaluate an interactive Roblox game as a supplementary learning medium for Arabic vocabulary instruction. A Research and Development (R&D) approach employing the Four-D model (define, design, develop, and disseminate) was adopted. The participants consisted of 21 eleventh-grade students of Islamic Senior High School As-Syafi'iyah 02, Bekasi, and two expert validators. Data were collected through observations, interviews, questionnaires, and validation sheets, and analyzed using descriptive qualitative and quantitative techniques. The needs analysis revealed a strong demand for interactive learning media, with students expressing positive attitudes toward digital game-based learning. Based on these findings, a Roblox-based game, Pocket Arabic, was developed by integrating curriculum-aligned vocabulary materials, contextual learning tasks, challenges, rewards, and immediate feedback. Expert evaluation demonstrated high feasibility, with scores of 100% for content validity and 86% for media quality. Student responses reached 66.29%, indicating generally positive acceptance despite technical limitations. These findings suggest that Roblox is a feasible supplementary medium for Arabic vocabulary learning and offers practical contributions to technology-enhanced Arabic language education in Islamic Senior High Schools.

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INTRODUCTION

Arabic occupies a central position in Islamic education as the language of the Qur'an and Hadith and as a medium for accessing classical and contemporary Islamic scholarship (Ṭu'aymah, 2004). In Arabic language learning, vocabulary mastery is a fundamental component of communicative competence, as it enables learners to comprehend texts, express ideas, and participate effectively in communication (Nation, 2022). Given that vocabulary knowledge underpins the development of all language skills, insufficient vocabulary mastery often becomes a major obstacle to successful language acquisition, particularly in formal educational settings where exposure to the target language is limited (Nguyen, 2026; Sonbul et al, 2026).

Despite its critical importance, vocabulary acquisition remains a persistent challenge in Islamic secondary education. Students frequently perceive vocabulary learning as monotonous and difficult, which negatively affects their motivation and long-term retention. In many classroom practices, vocabulary instruction remains dominated by memorization-based activities with limited contextual use, resulting in low learner engagement and difficulties in applying vocabulary in meaningful communication (Hidayah et al., 2023). This challenge is compounded by the limited integration of digital resources in many Islamic schools, where instructional methods often fail to accommodate the diverse learning preferences of contemporary students (Langputeh et al., 2023; Majid et al., 2025). Consequently, students tend to struggle not only with memorizing vocabulary but also with using it appropriately in sentences and communicative contexts.

Preliminary observations and needs analysis conducted at Islamic Senior High School As-Syafi'iyah 02, Bekasi confirmed these challenges. All participating students (100%) expressed a need to improve their Arabic vocabulary mastery, while 61.9% reported difficulties in memorizing vocabulary items. Furthermore, 61.9% perceived conventional vocabulary instruction as monotonous, 90.5% preferred learning through digital media or educational games, and 95.2% believed that educational games could make learning more enjoyable. Notably, 85% of students expressed willingness to learn Arabic vocabulary through a Roblox-based learning environment. These findings indicate a strong demand for more engaging, interactive, and technology-mediated vocabulary learning media.

One instructional approach that has received considerable attention in recent years is Game-Based Learning (GBL). Previous studies have demonstrated that digital game-based learning can enhance learner motivation, engagement, and active participation through interactive challenges, immediate feedback, and meaningful learning experiences (Gee, 2007; Prensky, 2001; Wouters, P., & Van Oostendorp, 2013). In language education, game-based learning offers repeated exposure to vocabulary in enjoyable, contextualized environments, which can facilitate vocabulary retention and language acquisition (Cigeri et al., 2025; Chowdhury et al., 2024; Reinhardt, 2013). Moreover, multimedia learning theory suggests that combining verbal and visual information supports deeper cognitive processing and improves learning outcomes (Teng et al., 2023; Mayer, 2002; Masyitoh et al, 2026).

Among contemporary digital platforms, Roblox has emerged as one of the most popular virtual environments among adolescents. The platform enables users to engage in immersive three-dimensional experiences, collaborate with others, and complete task-oriented activities within interactive environments. These characteristics provide learners with opportunities to acquire knowledge through exploration, interaction, and experiential

learning. Recent studies have highlighted Roblox's potential to promote creativity, collaboration, social interaction, and learner engagement in educational contexts (Alhasan et al., 2023; Darmayunita et al., 2025; Han et al., 2023). Likewise, research on digital game environments has reported positive impacts on student participation, self-efficacy, and learning experiences across various subject areas (Almelhes, 2024; Wulandari et al., 2025; Zhang et al., 2026).

However, despite the growing body of research on educational games and virtual learning environments, studies focusing on Roblox-based learning media for Arabic language instruction remain limited. Although game-based learning has been widely explored in foreign language education, including Arabic language learning, most studies have used quiz-based applications, mobile learning platforms, or multimedia learning environments (Gofur et al., 2025; Kosim et al., 2025; Nurazizah et al.. Research investigating Roblox as a platform specifically designed for Arabic vocabulary instruction remains scarce, particularly in formal Islamic secondary education settings. Furthermore, limited attention has been given to integrating Arabic vocabulary materials into curriculum-based language-learning activities within immersive game environments (Malizal, 2025; Napida et al., 2024). Existing studies have also rarely reported the systematic development and expert validation of Roblox-based learning media aligned with Arabic language curriculum objectives.

This limitation reveals a significant gap in the field of technology-enhanced Arabic language learning research. While previous studies have demonstrated the educational potential of digital games, there remains a need for curriculum-aligned learning media that integrate Arabic vocabulary learning with meaningful language use in immersive digital environments (Sarah et al., 2024; Nordin et al., 2025). Addressing this gap is increasingly important given the growing demand for innovative learning resources that complement conventional classroom instruction and accommodate students' digital learning preferences (Hosaini et al., 2024; Thelma et al., 2024). From a theoretical perspective, integrating GBL principles with immersive 3D environments offers a promising avenue for addressing the motivational and cognitive challenges inherent in vocabulary learning (Adipat et al..

Therefore, this study aims to develop and evaluate a Roblox-based interactive game as a supplementary learning medium for Arabic vocabulary instruction at the Islamic senior high school level. Using a Research and Development (R&D) approach, the study focuses on needs analysis, media design and development, and feasibility evaluation through expert validation and student responses. Unlike previous studies that primarily examined students' perceptions of educational games or the general educational potential of Roblox, this study develops a curriculum-aligned learning medium that integrates Arabic vocabulary materials, contextual language tasks, and immersive game-based interaction. By providing a systematically developed and validated instructional product, this study contributes to the growing field of technology-enhanced Arabic language learning. It offers an innovative supplementary medium for vocabulary instruction in formal Islamic secondary education.

METHOD

This study employed a Research and Development (R&D) approach using the Four-D model proposed by Thiagarajan, which consists of four stages: define, design, develop, and disseminate (Thiagarajan, S., Semmel, D. S., & Semmel, 1974). The study was conducted at Islamic Senior High School As-Syafi'iyah 02, Bekasi, during the first semester of the

2025/2026 academic year. The R&D approach was selected because it is suitable for developing and evaluating educational products designed to address specific instructional needs.

The participants consisted of 21 eleventh-grade students and two expert validators, including one Arabic-language materials expert and one educational media expert. The students participated in the needs analysis and implementation stages, while the experts were involved in validating the developed learning media.

During the define stage, instructional needs were identified through classroom observations, interviews with the Arabic language teacher, and students' needs analysis questionnaires. This stage aimed to identify students' difficulties in learning Arabic vocabulary, their learning preferences, and their perceptions of digital game-based learning.

During the design stage, the researcher developed a Roblox-based interactive learning game and research instruments, including observation sheets, interview guidelines, expert validation questionnaires, and student response questionnaires. The game content was designed based on the Arabic vocabulary materials included in the eleventh-grade curriculum.

The development stage involved creating the learning media using Roblox Studio and conducting expert validation. The material expert evaluated the game's linguistic and instructional aspects, while the media expert assessed its design, usability, and technical quality. The validators' suggestions were used to revise and improve the product before implementation.

During the dissemination stage, the revised learning media were implemented in a limited classroom setting. Students were introduced to the game and allowed to use it during Arabic vocabulary learning activities. Subsequently, student responses toward the developed learning media were collected through questionnaires.

Data were collected through observations, interviews, questionnaires, and expert validation sheets. The use of multiple data sources enabled methodological triangulation, enhancing the credibility of the findings (Creswell & Creswell, 2018). Observation and interview data were used to identify instructional needs and support the interpretation of findings. Questionnaires were used to collect students' responses regarding the learning media, while expert validation sheets were used to assess the feasibility of the developed product.

The collected data were analyzed using descriptive, qualitative, and quantitative techniques. Qualitative data obtained from observations and interviews were analyzed through data reduction, data display, and conclusion drawing following the interactive analysis model (Miles, M. B., & Huberman, 1994). Quantitative data obtained from expert validation and student response questionnaires were analyzed using percentage-based descriptive statistics to determine the feasibility level of the developed learning media (Sugiyono, 2019). The results were then interpreted according to predetermined feasibility criteria.

RESULT AND DISCUSSION

Result

This section presents the findings obtained from the development and evaluation of a Roblox-based interactive learning medium for Arabic vocabulary instruction. In accordance with the Four-D development model, the results are organized into four stages: needs analysis, design, development, and dissemination. The findings focus on identifying learners' needs, describing the characteristics of the developed media, reporting expert validation outcomes, and presenting students' responses during classroom implementation. As this study employed a Research and Development (R&D) approach, the results primarily emphasize the feasibility and practical implementation of the developed product rather than measuring its effectiveness through experimental comparisons.

Needs Analysis Stage

The needs analysis stage was conducted to identify students' difficulties and preferences in learning Arabic vocabulary. Data were collected through classroom observations, interviews with Arabic language teachers, and questionnaires administered to eleventh-grade students at Islamic Senior High School As-Syafi'iyah 02, Bekasi. The questionnaire results are summarized in Table 1.

Table 1. Results of Students' Needs Analysis

No	Indicator	Percentage
1	Need to improve Arabic vocabulary mastery	100%
2	Difficulty in memorizing vocabulary	61.9%
3	Conventional learning is monotonous	61.9%
4	Preference for digital media and educational games	90.5%
5	Educational games make learning more enjoyable	95.2%
6	Willingness to learn through Roblox	85%

The results revealed a strong need for more engaging media for vocabulary learning. All participating students (100%) indicated that they needed to improve their mastery of Arabic vocabulary. In addition, 61.9% reported difficulties in memorizing vocabulary items, while 61.9% perceived conventional vocabulary learning activities as monotonous. Furthermore, 90.5% of students preferred learning through digital media or educational games, and 95.2% believed that game-based learning could make the learning process more enjoyable. Notably, 85% of students expressed willingness to learn Arabic vocabulary in a Roblox-based learning environment.

These findings indicate that students experience challenges in vocabulary learning and show a strong preference for interactive digital learning media. Therefore, the development of a Roblox-based learning medium was considered relevant to students' needs and learning preferences.

Design Stage

Based on the findings of the needs analysis, a Roblox-based interactive learning game, Pocket Arabic, was designed as a supplementary medium for Arabic vocabulary instruction. The design process focused on addressing students' difficulties in vocabulary learning while accommodating their preference for interactive digital learning environments. Accordingly,

the learning activities were designed to provide a more engaging, context-rich learning experience than conventional vocabulary instruction.

The game interface was designed with a simple, user-friendly layout suitable for secondary school students. Particular attention was given to navigation, visual clarity, and ease of access to ensure that students could interact with the learning content without requiring extensive technical guidance.

Figure 1. Main Interface of the Roblox-Based Educational Game

The instructional content was adapted from the Arabic-language textbook officially used at Islamic Senior High School As-Syafi'iyah 02 Bekasi to ensure alignment with the curriculum objectives and learning outcomes. The selected vocabulary materials corresponded to the topics taught in the eleventh-grade curriculum and were organized according to students' proficiency levels.

The learning activities were structured progressively to support gradual vocabulary acquisition. Students first encountered vocabulary recognition tasks before proceeding to activities requiring vocabulary comprehension and application. This sequence was intended to facilitate meaningful learning by allowing students to move from basic lexical recognition to contextual language use.

To support these objectives, the game incorporated multiple-choice questions and fill-in-the-blank exercises that required students to identify and apply Arabic vocabulary in context.

الجدول: أسئلة الاختيار من متعدد وأجوبتها الصحيحة في اللعبة التعليمية على منصة روبلوكس

الرقم	السؤال	الإجابة الصحيحة
1	السَّاعَةُ الْخَامِسَةُ	05:00
2	السَّاعَةُ السَّابِعَةُ وَالنِّصْفُ	07:30
3	السَّاعَةُ الْعَاشِرَةُ إِلَّا رُبْعًا	09:45
4	السَّاعَةُ الثَّالِثَةُ وَالنِّصْفُ	03:30
5	مَا هِيَ الْعِبَارَةُ الصَّحِيحَةُ؟ (01:10)	السَّاعَةُ الْوَاحِدَةُ وَعَشْرُ دَقَائِقَ
6	إِمْلَأِ الْفَرَاغَ بِالْإِجَابَةِ الصَّحِيحَةِ: (السَّاعَةُ الآنَ ___ صَبَاحًا)	الْخَامِسَةُ
7	إِمْلَأِ الْفَرَاغَ بِالْإِجَابَةِ الصَّحِيحَةِ: (أَسْتَيْقِظُ مِنَ ___ ثُمَّ أَتَوَضَّأُ)	النَّوْمِ
8	إِمْلَأِ الْفَرَاغَ بِالْإِجَابَةِ الصَّحِيحَةِ: (وَأَذْهَبُ إِلَى ___ لِصَلَاةِ الصُّبْحِ جَمَاعَةً)	الْمَسْجِدِ
9	إِمْلَأِ الْفَرَاغَ بِالْإِجَابَةِ الصَّحِيحَةِ: (ثُمَّ ___ الْقُرْآنَ)	أَقْرَأُ
10	أَحْمَدُ يَنَامُ فِي السَّاعَةِ (09:01)	التَّاسِعَةُ وَدَقِيقَةٌ وَاحِدَةٌ

Figure 2. Multiple-Choice Questions and Answer Keys in the Game

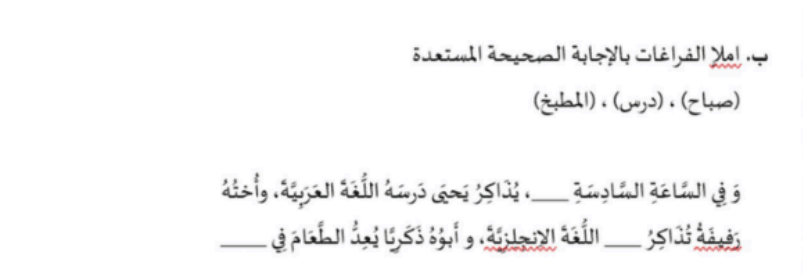

Figure 3. Fill-in-the-Blank Activity in the Roblox Game

These activities were designed not only to reinforce vocabulary recognition but also to encourage students to connect lexical items with their appropriate usage in sentences. Furthermore, immediate feedback was integrated into the game so that students could receive direct responses to their answers during gameplay. Additional game elements such as level progression, challenges, and rewards were incorporated to enhance learner engagement and motivation. By integrating instructional and game-design elements, the Pocket Arabic game was designed to provide a more interactive, contextualized, and enjoyable vocabulary-learning experience.

Development Stage

During the development stage, the instructional design was transformed into a functional, interactive learning medium using Roblox Studio. At this stage, all previously designed learning components, including vocabulary materials, learning tasks, navigation systems, and game mechanics, were integrated into a playable educational game entitled *Pocket Arabic*. The objective of this stage was to create an interactive learning environment that could support Arabic vocabulary learning through meaningful engagement and contextualized learning activities.

The implementation process involved developing the game environment, embedding instructional content into gameplay activities, and configuring interactive features that would guide students through the learning process. To facilitate accessibility, students could access the game directly through the Roblox platform using either mobile devices or computers.

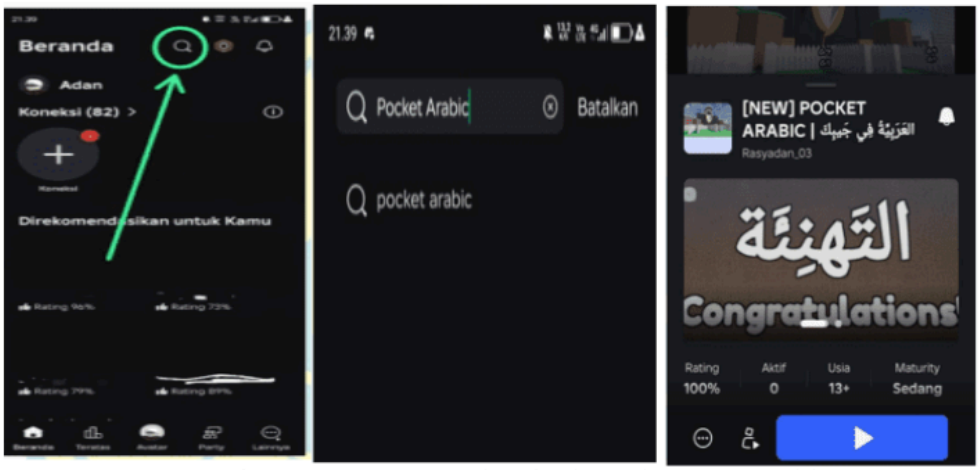

Figure 4. Accessing the "Pocket Arabic" Game on Roblox

To ensure that students could easily navigate the learning environment, clear instructions and step-by-step guidance were incorporated into the game. Students were guided through various learning levels and activities designed to support vocabulary acquisition and application.

Figure 5. How to Use the "Pocket Arabic" Game

The development process emphasized integrating educational content with game-based elements. Features such as challenges, rewards, level progression, and immediate feedback were incorporated to increase learner motivation and sustain engagement throughout the learning activities. In addition, vocabulary exercises and contextual language tasks were embedded in the game environment to encourage students to actively engage with the learning materials rather than passively memorize vocabulary items.

Upon completion of the development process, the product underwent expert validation to assess its feasibility and quality before classroom implementation. The validation involved one Arabic-language materials expert and one educational media expert. The material expert assessed the appropriateness of the vocabulary content, language use, instructional objectives, and curriculum alignment. In contrast, the media expert evaluated the game's design quality, usability, navigation, visual appearance, and technical functionality.

Table 2. Expert Validation Results

Validator	Maximum Score	Obtained Score	Percentage	Category
Material Expert	50	50	100%	Highly Valid
Media Expert	215	189	86%	Highly Valid

The validation results indicate that the developed learning media are highly feasible. The material expert awarded the maximum score (100%), indicating that the instructional content, vocabulary materials, and learning objectives were fully aligned with the Arabic language curriculum and students' learning needs. Similarly, the media expert evaluation yielded a score of 86%, placing it in the "highly valid" category, demonstrating that the game possessed satisfactory design quality and technical functionality for educational use.

Overall, the validation findings suggest that the developed Roblox-based learning medium was pedagogically appropriate and technically feasible for classroom

implementation. Therefore, the product proceeded to the dissemination stage for limited classroom use and student evaluation.

Dissemination Stage

The dissemination stage was conducted through a limited classroom implementation involving eleventh-grade students at Islamic Senior High School As-Syafi'iyah 02, Bekasi. During this stage, the developed Roblox-based learning medium was introduced and utilized as a supplementary tool for Arabic vocabulary learning. Before implementation, students received a brief explanation of the learning activity objectives, procedures for accessing the game on the Roblox platform, and instructions for navigating the learning tasks within the game environment.

Students subsequently participated in learning activities using the *Pocket Arabic* game through mobile devices and computers under the supervision of the researcher and the Arabic language teacher. During the implementation, students completed vocabulary-learning tasks embedded within the game environment and interacted with various game features designed to support vocabulary recognition and contextual language use.

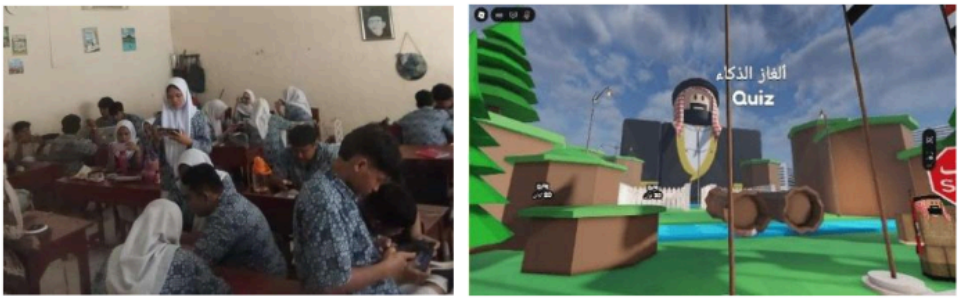

Figure 6. Classroom Implementation of the Roblox-Based Learning Media

The classroom implementation demonstrated that students successfully accessed and used the learning media. Observational data indicated that students actively participated in the learning activities and showed enthusiasm as they interacted with the game environment. Several students were observed discussing vocabulary items with their peers and collaborating in complete the learning tasks. These observations suggest that the game-based environment encouraged active participation and created a more engaging learning atmosphere.

Following the implementation, students were asked to complete a response questionnaire to evaluate their perceptions of the developed learning media. The questionnaire assessed several aspects, including clarity of instructions, ease of use, attractiveness, learning motivation, and perceived usefulness of the game. The results of students' responses are presented in Table 3.

Table 3. Students' Responses toward the Learning Media

Aspect	Obtained Score	Maximum Score	Percentage	Category
Student Responses	696	1050	66.29%	Moderately Positive

The findings indicate that students generally responded positively to the developed learning media. Many students reported that the game created a more enjoyable learning atmosphere and increased their interest in learning Arabic vocabulary. The implementation also showed that the game-based environment encouraged active participation during learning activities. Nevertheless, several students reported minor technical difficulties related to device performance and internet connectivity, which may have influenced the overall response score.

To provide a comprehensive evaluation of the developed product, the results from expert validation and student responses are summarized in Table 4.

Table 4. Summary of Evaluation Results

Data Source	Percentage	Category
Material Expert	100%	Highly Valid
Media Expert	86%	Highly Valid
Students	66.29%	Moderately Positive

The expert validation results indicate that the developed learning media possess a high level of validity in terms of instructional content, curriculum alignment, design quality, and technical functionality. Meanwhile, student responses suggest that the media was generally accepted and positively perceived during classroom implementation, although several technical aspects still require improvement. Overall, the dissemination stage demonstrated that the developed Roblox-based learning media can be implemented in Arabic vocabulary learning activities and has potential as a supplementary learning medium for Islamic secondary education. Further refinement of technical features and user experience is recommended to support broader implementation in future studies.

Discussion

The findings of this study demonstrate the potential of a Roblox-based learning environment as a supplementary medium for Arabic vocabulary instruction in Islamic secondary education. The needs analysis revealed that students experienced difficulties in vocabulary learning and expressed a strong preference for more interactive and technology-supported learning environments. Specifically, 90.5% of students preferred learning through digital media or educational games, 95.2% believed that educational games could make learning more enjoyable, and 85% expressed willingness to learn Arabic vocabulary through a Roblox-based environment. These findings indicate that the development of digital game-based learning media closely aligns with students' learning needs and preferences.

These results are consistent with the Game-Based Learning (GBL) literature, which emphasizes that digital games can enhance learner engagement and motivation through challenge-based tasks, feedback mechanisms, and goal-oriented interaction (Gee, 2007; Prensky, 2001; Zainuddin et al.. In language-learning contexts, game-based environments also provide repeated exposure to vocabulary in meaningful, contextualized situations, which may support vocabulary learning (Feng, 2024; Reinhardt, 2013). Accordingly, the high level of student acceptance in this study reflects the relevance of game-based approaches for contemporary learners.

From a design perspective, expert validation results indicate a high level of feasibility of the developed product. The material expert evaluation (100%) confirms that the vocabulary content and instructional objectives are aligned with the Arabic language curriculum. In comparison, the media expert evaluation (86%) indicates that the interface design, navigation system, and technical features are appropriate for educational use. These findings highlight the importance of integrating pedagogical validity with usability and instructional design quality in the development of digital learning media.

The implementation phase revealed generally positive learner engagement. Students actively participated in learning activities, interacted with game-based features, and demonstrated enthusiasm during vocabulary exercises. These observations are consistent with gamification principles, which suggest that elements such as rewards, progression, and immediate feedback can enhance learner motivation and engagement (Almelhes, 2024; Deterding et al., 2011; Godwin, 2014). However, these findings should be interpreted as indicators of engagement and learning experience rather than evidence of learning effectiveness.

Furthermore, the learning process can be understood through the lens of Situated Learning Theory, which emphasizes knowledge construction through participation in meaningful, context-rich activities (Lave, J., & Wenger, 1991). Within the Roblox environment, students engaged in contextual vocabulary tasks that simulated communicative situations rather than isolated memorization. This approach is further supported by constructivist learning theory, which views learning as an active process of meaning-making through interaction and experience (Morreale & Rosa, 2024; Piaget, J., and Inhelder, 1972).

In addition, the instructional design reflects the concept of communicative competence, particularly in encouraging the use of vocabulary in meaningful sentence-level contexts (Canale, M., & Swain, 1980). Although communicative outcomes were not measured quantitatively, the learning activities were designed to facilitate contextualized language use within structured tasks.

The positive learner responses may also be explained through affective factors in language learning. The interactive and game-based environment appears to reduce boredom and increase learner comfort, which may support more active participation. This is consistent with Krashen's Affective Filter Hypothesis, which emphasizes the role of emotional conditions in language acquisition (Krashen, 1982).

However, a notable discrepancy was observed between expert validation results and student response scores (66.29%). This gap suggests that implementation challenges influenced user experience, particularly technical limitations, device compatibility issues, and internet connectivity constraints. These factors highlight the importance of infrastructure readiness in the successful integration of immersive learning technologies in school contexts.

It is important to emphasize that this study focuses on product development and feasibility evaluation within a Research and Development (R&D) framework rather than measuring instructional effectiveness. Therefore, the findings should be interpreted as evidence of validity, practicality, and user acceptance of the developed learning media, not as proof of improved vocabulary achievement. Future studies are recommended to employ experimental or quasi-experimental designs to examine the effectiveness of Roblox-based learning environments on vocabulary acquisition.

Overall, this study contributes to the field of technology-enhanced Arabic language learning by demonstrating the feasibility of integrating curriculum-based vocabulary instruction into a Roblox-based interactive learning environment. By combining pedagogical content with game-based interaction, the study provides an alternative instructional model that supports engaging vocabulary learning experiences in Islamic secondary education contexts.

CONCLUSION

This study developed and validated a Roblox-based interactive learning medium as a supplementary tool for Arabic vocabulary instruction in Islamic secondary education. The findings demonstrate that the developed media is pedagogically feasible, achieving high expert validation and positive student acceptance, indicating that Roblox can effectively support curriculum-aligned vocabulary learning through contextual tasks, gamification, and interactive learning experiences. By addressing the limited application of immersive three-dimensional game platforms in Arabic language education, this study contributes a validated instructional design that expands the implementation of technology-enhanced learning for Arabic vocabulary instruction.

From a practical perspective, the developed medium provides Arabic language teachers with an alternative digital resource to complement conventional classroom instruction and to promote more engaging vocabulary-learning experiences. However, this study was limited to a small-scale implementation in a single institution and focused primarily on product development and feasibility rather than measuring learning effectiveness. Future research should employ experimental or quasi-experimental designs with larger, more diverse samples to examine the effects of Roblox-based learning on vocabulary acquisition, retention, motivation, and engagement. Overall, the findings highlight the potential of immersive game-based environments to support innovation in Arabic language education and encourage the broader integration of emerging digital technologies into language learning.

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AUTHOR CONTRIBUTIONS STATEMENT

[SJ] conceptualized the study, supervised the overall research process, and provided critical guidance on the research design and theoretical framework. [MS] contributed to the development of the research framework, supported methodological decisions, and assisted in supervising the research implementation. [SM] provided academic supervision, contributed to theoretical validation, and ensured the alignment of the study with scholarly standards. [AR] conducted data collection, developed the educational game, performed data

analysis, and drafted the initial manuscript. [WM] assisted in data collection, supported the technical development and implementation of the educational game, and contributed to the revision of the manuscript. All authors reviewed, edited, and approved the final version of the manuscript.

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