Research Article

Unleashing the Power of Play: A Digital Hangman Game to Supercharge Arabic Vocabulary

Mohd Zaki Shahabuddin[1]*, Fatimah Noni Muhammad[1], Zati Hanani Ismail[1], Muhammad Firdhaus Zulkifli[2], and Zulaida Rahmi[3]

[1]Faculty of Business and Management Sciences, Universiti Islam Antarabangsa Tuanku Syed Sirajuddin (UniSIRAJ), Kangar, Perlis, Malaysia
[2]Faculty of Islamic Studies, Universiti Islam Antarabangsa Tuanku Syed Sirajuddin (UniSIRAJ), Arau, Perlis, Malaysia
[3]Faculty of Computer Science and Information Technology, Universitas Muhammadiyah Mahakarya Aceh, Bireuen, Aceh, Indonesia

ORCID
Mohd Zaki Shahabuddin: https://orcid.org/0009-0000-6686-6032

Abstract.
Learning Arabic as a foreign language often causes challenges for school students because of the significant differences to their mother tongue and the unappealing methods of traditional teaching and learning. This development research of online digital game application aims to develop and evaluate an innovative, simple and interactive learning method by adapting the traditional *Hangman* childhood game by using web-based application development technology of HTML, JavaScript and CSS. The development methodology of this application involves an iterative process between needs analysis, designing, developing, and testing prototypes to ensure that the game produced is of high quality and hopefully meets the needs of students in improving their mastery of Arabic vocabulary. The *Hangman* digital game that was developed is expected to overcome non-interactive traditional learning methods, with aim to increase students' motivation in mastering their Arabic vocabulary. The results of the study are expected to contribute to the field of Arabic education by providing an effective learning alternative that attract school students.

Keywords: Arabic language, gamification, hangman game, teaching and learning, vocabulary

Corresponding Author: Mohd Zaki Shahabuddin; email: mzaki@kuips.edu.my

Published: 25 September 2025

Publishing services provided by Knowledge E

Selection and Peer-review under the responsibility of the 2nd International Office Conference 2024 Committee.

1. INTRODUCTION

Learning Arabic as a foreign language at school level is often considered challenging and less interesting for students. This is due to the significant difference between the Arabic writing system, grammar, and pronunciation with their mother tongue [1]. In addition to traditional teaching methods, students might disinterest and lose motivation to learn the language that frequently emphasized on memorization and rigorous routine exercises. Therefore, it is thought that this problem could be resolved by using

creative, engaging, and enjoyable teaching methods like digital games based on Arabic vocabulary.

Game-based application offers many advantages in language learning, including the ability to provide immediate feedback, provide various and engaging practice, and encourage self-directed learning [2]. In the context of learning Arabic vocabulary, a digital game-based application can be created to assist students in picking up new words, comprehending their meanings, and practising their pronunciation and spelling.

This study aimed to develop a simple digital game-based application, and to examine its effectiveness in improving the mastery of Arabic vocabulary among students. Specifically, this study emphases on digital game development analysis and design for the purpose to assist students learn Arabic vocabulary, that related to specific topics in Malaysian secondary school curriculum. By using an appropriate research design, this study abled to provide empirical evidence on the extent to which digital game application can improve students' Arabic vocabulary mastery, as well as identify factors that affect the effectiveness of using digital games in the context of language learning.

Hence, it is expected the results of this study can offer a unique and engaging approach to mastering Arabic vocabulary for school students, and in addition to provide inspiration to other researchers to conduct further studies on the use of technology in Arabic language learning.

2. LITERATURE REVIEW

Several studies highlighted the drawbacks of conventional language learning, which is sometimes dominated by repeated drills and routine memorization and result in lower student engagement and poor vocabulary retention. The use of technology in teaching and learning, specifically digital games, has been the main focus in recent studies. Digital game-based applications offered many advantages over traditional learning methods, including the ability to provide immediate feedback, provide various and engaging exercises, and encourage self-directed and flexibility in learning [3,4]. These factors has contributed towards students' motivation, and escalating the active involvement of students in learning process.

A growing body of research suggested that digital game-based application able to enhance student engagement and motivation in learning the foreign language. Several studies had shown the effectiveness of digital educational games in improving

students' vocabulary proficiency [3,4,5,6]. As example, Hartt *et al*. steered a study on Italian language learners and found that the use of digital games had increased students' motivation to learn Italian, and at the same time also increased their vocabulary significantly [5]. Another study by Ghamdi *et al.* showed that digital games can help English language learners improve their reading and writing skills significantly [6].

For instance, a study by Al Ayub *et al.* found that digital games can reduce language anxiety and increase motivation among school students [7]. Furthermore, digital games also provide authentic language practice opportunities and immediate feedback, promoting language acquisition. Yang, they argued that digital games able to foster more immersive and interactive learning environment, leading to increased language proficiency among learners [8].

Developmental research provides a strong foundation for the creation of digital educational products, particularly those involving technology such as digital games [9]. This cyclical approach starts with a comprehensive needs analysis to determine the target learners' unique learning requirements and obstacles. This is followed by a detailed design phase, outlining the features, functionality, and considering learning objectives, instructional strategies, and user experience design [9]. The development phase involves creating the actual game-based application, such as the digital Hangman game, requiring expertise in development technologies. All over the process, continuing evaluation is essential, to gather feedback from learners and educators to assess the game effectiveness and identify areas for improvement [10]. Developmental research has a wide range of applications in education, including instructional design, technology integration, teacher training, and curriculum development.

The study outcome by Dinc stated an application that made use of web-based development tools of HTML, CSS, and JavaScript's interactive features, able to produce an immersive and captivating game-based learning environment [11]. The outline of game objects and user interactions will be defined using HTML, which will also serve as the structural foundation for the game environment. Meanwhile CSS (Cascading Style Sheets) will be used to improve the game's visual appearance. Implementation of game logic such managing input by users, providing real-time feedback, and dynamically set the game's difficulty were all made the possibility by JavaScript. Hence, a dynamic and engaging learning environment that encourages active learning, problem-solving abilities, and intrinsic motivation will be made possible by the mix of these tools.

3. METHODOLOGY

This study uses a developmental research methodology adapting The ADDIE model (Analysis, Design, Development, Implementation, Evaluation) which is commonly used in the study of digital game development. The model consists the phases of requirements analysis, design, development, implementation, and evaluation based on Branch that aims to develop digital game that is effective and suitable for learning Arabic vocabulary at the secondary school level [12].

The game development process will involve several stages as depicted in Figure 1.

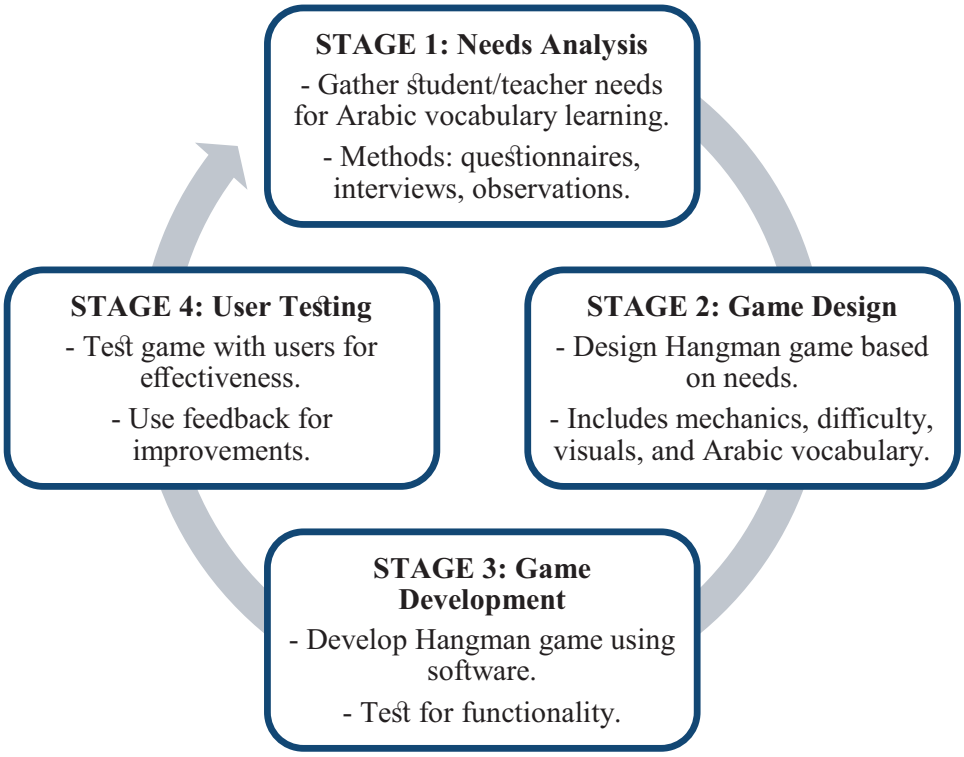

Figure 1: The Process Flow of the Developmental Research Methodology for the Hangman Game.

In line with above process, previous research projects that have to do with the use of digital games in language learning also were considered [3,4,5,13] to provide information about effective game mechanics for enhancing student motivation and language proficiency.

3.1. Needs Analysis

Short interviews were conducted with twenty-five secondary school students aged between 15–17-year-old, in the state of Perlis, Malaysia, that taking Arabic Language in

their study. The outcome from the interview showed that they faced various challenges in learning Arabic vocabulary as depicted in Table 1.

TABLE 1: Challenges Faced by School Students in Learning Arabic Language.

Learning Challenges	Description	Impact on Students	No of responses
Not interesting	Traditional methods are perceived as boring, focusing on memorization.	Reduced interest and motivation in learning Arabic vocabulary.	23
Problem to memorize	Significant differences between Arabic and students' native language hinder vocabulary retention.	Frustration and difficulty in recalling vocabulary.	23
Lack of interactive training	Insufficient opportunities for fun and practical application of Arabic vocabulary.	Difficulty in applying vocabulary in real-world contexts and reduced fluency.	25

Overall, the students also felt they prefer learning through digital games because they are more interesting, interactive, and fun. They also anticipated that digital games could help them learn Arabic vocabulary more easily and effectively.

3.2. Game Design

Based on the results of the needs analysis and taking into account the characteristics of digital game that is proven to be effective in language learning [9,12,14], Hangman digital game for learning Arabic vocabulary is developed with a focus on several key elements as depicted in Figure 2, where the details are explained in Table 2.

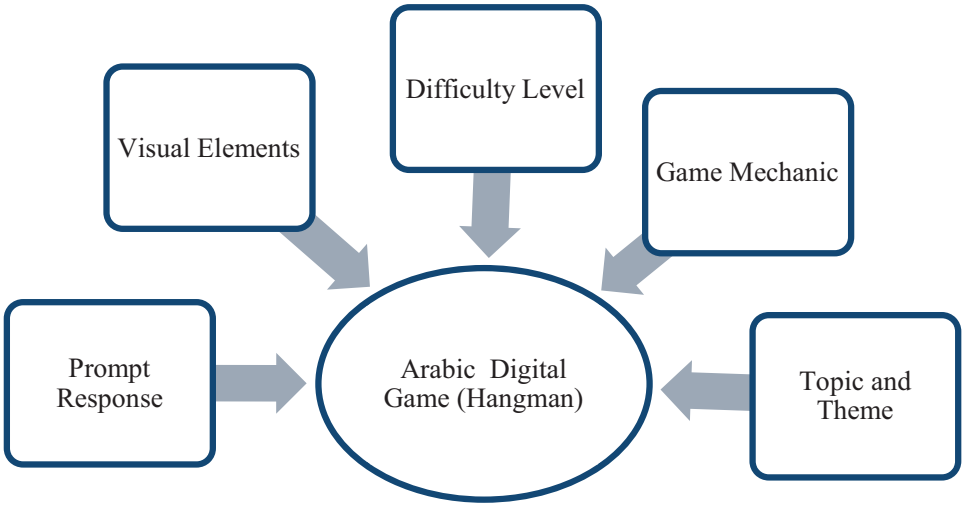

Figure 2: Elements to be Accommodated in Hangman Digital Game.

Table 2: Hangman Digital Game Design Specifications.

Element	Features	Details/Examples
Topic and Theme	Curriculum Relevance	- Aligns with Arabic language school syllabuses: daily use verbs, basic nouns, simple expressions.
Game Mechanic	Word Guessing	- Displays empty spaces for letters. - Provides clues for guessing. - Letter-by-letter guessing. - "Hangman" picture drawn with wrong guesses. - Wins by guessing correctly before "hangman" is complete.
Difficulty Levels	Varied Challenges	- Easy: 3-5 letter words. - Medium: 6-9 letter words. - Difficult: 10+ letter words.
Visual Elements	Engaging Graphics	- Colorful and attention-grabbing visuals. - Animations for correct/incorrect guesses. - Progressive "hangman" drawing for suspense.
Prompt Response	Immediate Response	- Instant feedback on letter guesses. - Correct letters displayed in spaces. - "Hangman" progress for incorrect guesses.

3.3. Game Development

Based on the design that has been detailed in the previous, the process of developing a digital Hangman game for learning Arabic vocabulary is implemented using web technology, namely HTML (Hypertext Markup Language) for the structure and content of the game, and JavaScript for the logic and interaction of the game. The selection of this web technology is based on several factors, including:

1. Accessibility: Web-based games can be easily accessed through web browsers on various devices, such as computers, smartphones, and tablets.
2. Cost Effective: Web-based game development does not require expensive specialized software, making it more cost-effective.
3. Ease of Updating: Web-based games can be updated easily without having to download and install new versions.

The game development involves several main technical elements as depicted in Table 3.

Table 3: Technical Elements in Digital Game Development.

Technical Element	Description
HTML Structure	- Display of words to be guessed. - A virtual keyboard. - A "hangman" picture.

TABLE 3: Continued.

Technical Element	Description
Logic JavaScript Coding	- Logic of the random words. - User input detection. - Guess evaluation. - Game updates.
CSS (Cascading Style Sheets) Styling	- CSS styles the game by setting colours, fonts, and elements layout.
Integration of Arabic Vocabulary	- Arabic words are stored in JavaScript with minimal coding required. - Difficulty varies by adjusting word length and clues.

4. Result of Game Design

The result from the above game development phase is a complete and functional web-based digital Hangman game prototype. This prototype contained all the features that have been set in the game design and has been tested to ensure that it met the set quality criteria. This prototype is used in the user testing phase to get feedback from the target students. The followings are the screen-capture of the resulting Hangman game that been developed.

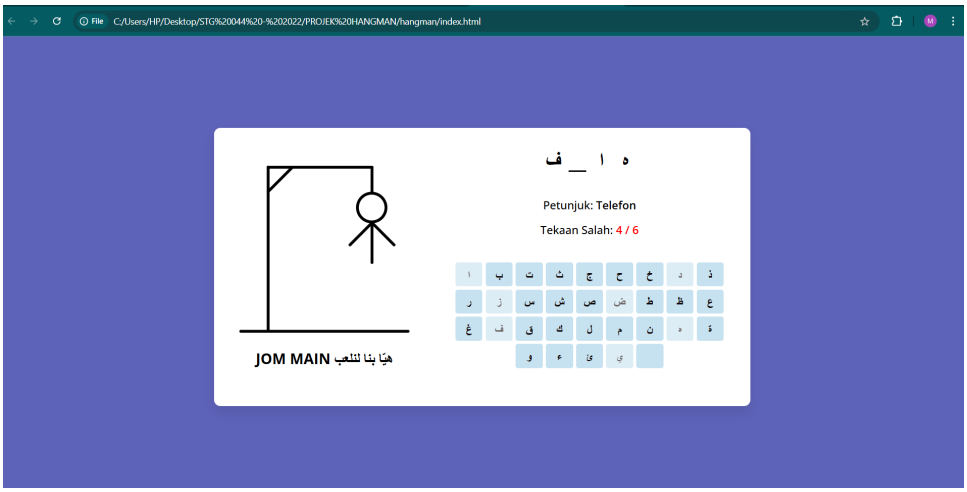

Figure 3: Interface design of workable Hangman digital game.

4.1. User Testing

The Hangman game was tested by the same secondary school students who were interviewed in the needs analysis phase. Prior to that, the game has been evaluated thoroughly by the school teacher to rectify its workable mechanics and its expected prompt result to be shown.

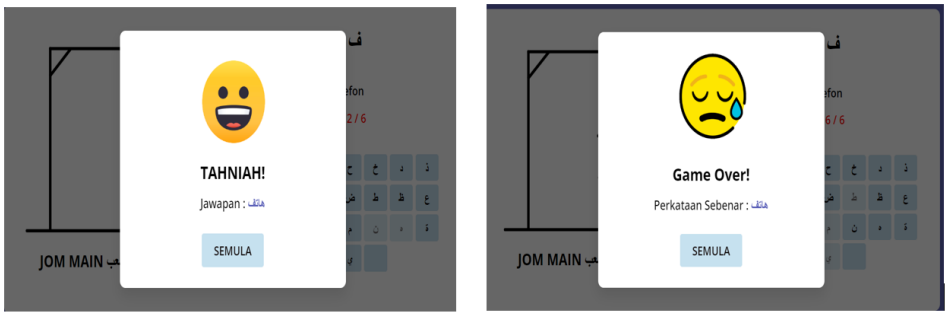

Figure 4: Simple animation displayed when the student guesses a letter correctly or incorrectly.

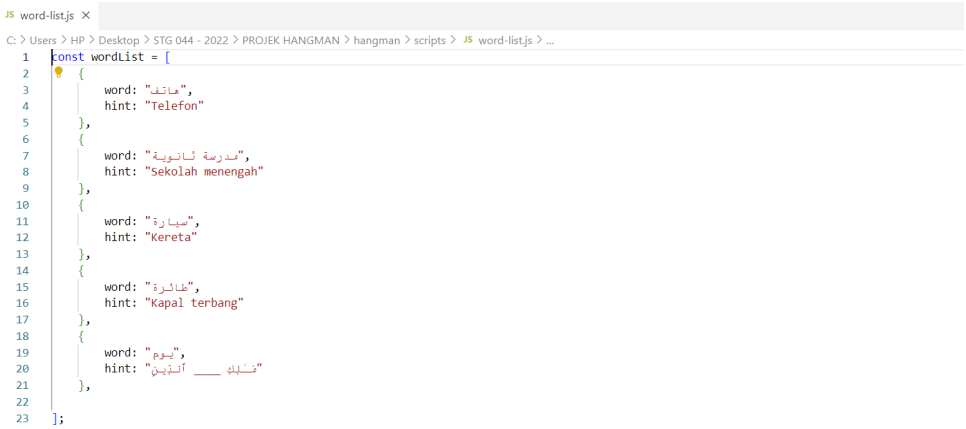

Figure 5: A simple script for educator to update unlimited list of words with little programming skill.

Feedback from students showed that they really like this game and find it very helpful in learning Arabic vocabulary. Students also provided some suggestions for improvement, such as adding more difficulty levels and providing more vocabulary options.

5. CONCLUSION

Overall, this study showed that the Hangman digital game that successfully developed has good potential to increase the mastery of Arabic vocabulary among school students. This game not only increased students' motivation and involvement in the learning process, but could also helped them learn Arabic vocabulary more easily and effectively.

However, this study only tested on few numbers of student as its sample test. The test period also very brief and not that adequate, hence limiting the ability to assess long-term effects on learning, motivation, and behaviour change among the students. Therefore, further works should be conducted involving bigger sample size and a longer

test period to confirm the effectiveness of the game. Further, the game mechanic is suggested to be enhanced to include the followings:

1. Develop a more complete version of digital Hangman game with various features and functions such collaborative learning and competition leaderboard, a comprehensive mini-Arabic thesaurus that support the play of the sounds for each vocabulary tested, and support for multilingual that allow students from around the world to play with it.

2. Conduct an experimental study to compare the effectiveness of a digital Hangman game with traditional learning methods.

3. Studying the long-term effects of using a digital Hangman game on students' mastery of Arabic vocabulary.

References

[1] Abdul Razif Z, Mohd Zaki AR. Arabic language vocabulary size and its relation with speaking skills. Jurnal Sultan Alauddin Sulaiman Shah. 2017;4(1):220–8.

[2] Ling NS, Abdul Aziz A. The Effectiveness of Game-based Learning Strategies on Primary ESL Learners' Vocabulary Learning. International Journal of Academic Research in Progressive Education and Development. 2022;11(2):845–60.

[3] Abd. Ghani MT, Wan Daud WA. The Impact of Digital Game-Based Learning Towards Arabic Language Communication. *Jurnal Komunikasi: Malaysian Journal of Communication*. Jilid. 2023;39(1):407–24.

[4] Fajar M, Rachmawati M. The Effectiveness of "Gamilab" Media Online Games for Arabic Vocabulary Mastery at Junior High School. Reslaj: Religion Education Social Laa Roiba Journal. 2024;6(9):4536–55.

[5] Hartt M, Hosseini H, Mostafapour M. Game on: exploring the effectiveness of game-based learning. Plann Pract Res. 2020;32(5):589–604.

[6] Ghamdi H, Alnajami M. A literature review on the impact of digital games on improving students' english language writing skills. Paripex Indian Journal of Research. 2022;109-111:109–11.

[7] Al Ayub AA, Segarawati E, Komariah A, Hassan I, Thahir I, Hussein Ali M, et al. Investigating the Effect of Using Game-Based Learning on EFL Learners' Motivation and Anxiety. Educ Res Int. 2022;2022:6503139.

[8] Yang X. (2019). A Critical Review and Analysis: What Role of ICT Plays in Improving Professional Teachers' English Instruction? *Advances in Language and Literary Studies*. https://doi.org/10. 129. 10.7575/aiac.alls.. v.10n.2p.129.

[9] Richey RC, Klein JD. Developmental research methods: creating knowledge from instructional design and development practice. J Comput High Educ. 2005;16(2):23–38.

[10] Abuhassna H, Alnawajha S. Instructional Design Made Easy! Instructional Design Models, Categories, Frameworks, Educational Context, and Recommendations for Future Work. Eur J Investig Health Psychol Educ. 2023 Mar;13(4):715–35.

[11] Dinc E. Web-based education and accessibility [IJTES]. International Journal of Technology in Education and Science. 2017;1(1):29–35.

[12] Branch RM. Instructional design: The ADDIE approach. Springer Science & Business Media; 2009. https://doi.org/10.1007/978-0-387-09506-6.

[13] Almelhes S. Gamification for teaching the Arabic language to non-native speakers: a systematic literature review. Front Educ (Lausanne). 2024;9:1371955.

[14] Wang F, Hannafin MJ. Design-based research and technology-enhanced learning environments. Educ Technol Res Dev. 2005;53(4):5–23.

[15] Abdul Ghani MT, Hamzah M, Wan Daud WA, Muhamad Romli TR. The Impact of Mobile Digital Game in Learning Arabic Language at Tertiary Level. Contemp Educ Technol. 2022;14(1):ep344.

[16] Rakasiwi IH, Rachmawati M. The Effect of Crossword Puzzle Media on Writing Skills in Arabic Language Learning. Jurnal Studi Guru Dan Pembelajaran. 2024;7(3):1102–11.