

Android-Based Ngarit Game for Introducing Rice Farming Activities

Boby Kurniawan Sugianto Putra^{1*}, Miftahus S.²⁾, M. R. Zamroni³⁾

^{1,2,3)} Informatics Engineering, Faculty of Science and Technology, Universitas Islam Lamongan, Indonesian

E-mail : bobykurniawan75@gmail.com¹⁾, miftahuss@gmail.com²⁾, mrzamroni@gmail.com³⁾

ARTICLE INFORMATION

Article History:

Received by Editor: February 09, 2026

Final Revision: March 07, 2026

Published Online: May 01, 2026

KEYWORDS

Game, Application, Ngarit

CORRESPONDENCE

E-mail: bobykurniawan75@gmail.com*

ABSTRACT

The activity of ngarit is one of the activities of rice cultivation process. This process is usually done by farmers to produce rice seeds. From the process, the game is backgrounded in the making to introduce the community to the process of farming. Game in Indonesian is defined as a game, the game itself has many benefits such as improving the workings of the brain, relieve stress, increase creativity and problem solving skills. From both backgrounds the researcher tried to develop a conceptual game about the cultivation process entitled "Android-Based Ngarit Game". That is the ngarit game with the concept of rice ngarit rules and design that makes players more familiar with the process of planting based on android platform built using Construct 2 and combined with Adobe Photoshop Cs 6 as a design software.

1. INTRODUCTION

The rapid advancement of information technology has significantly influenced various aspects of human life, including communication, education, entertainment, and business. One of the most widely adopted technologies is the Android operating system, which has become a dominant platform for mobile application development due to its accessibility, flexibility, and widespread use among smartphone users. The increasing popularity of Android devices has encouraged developers to create various applications that provide both entertainment and educational value [1].

Among the many applications developed for Android devices, digital games have become one of the most popular forms of entertainment. Games are no longer viewed solely as recreational tools but have evolved into interactive media capable of enhancing cognitive abilities, creativity, problem-solving skills, and decision-making processes [2]. Furthermore, educational games have emerged as an effective medium for delivering information and knowledge in a more engaging and enjoyable manner compared with conventional learning methods [3].

Indonesia is a country with a strong agricultural background, where rice farming plays an important role in supporting food production and local economies. However, modernization and urbanization have gradually reduced public awareness, particularly among younger generations, regarding traditional farming activities and agricultural culture. As a result, there is a need for innovative approaches that can introduce agricultural practices in a more attractive and interactive way [4].

One of the traditional farming activities commonly performed during rice cultivation is ngarit, which refers to the process of cutting or harvesting rice plants using simple agricultural tools. Although this activity is widely recognized within farming communities, public understanding of the process has decreased over time due to changing lifestyles and technological developments. Therefore, introducing agricultural concepts through digital media may help preserve local cultural knowledge while increasing public awareness of farming activities.

Game-based learning has been widely utilized as a medium for combining entertainment and

Available online: May 1st, 2026.

© 2026 The Authors. This is an open access article under the CC BY-SA license (<https://creativecommons.org/licenses/by-sa/4.0/>)

DOI: <https://doi.org/10.12962/j24068535.v23i1.aXXXX>

education. Through interactive gameplay, users can acquire knowledge while simultaneously enjoying the gaming experience. Previous studies have demonstrated that educational games can improve user engagement, motivation, and learning outcomes compared with traditional information delivery methods [5]. Consequently, the integration of agricultural themes into digital games presents an opportunity to create educational content that is both informative and entertaining.

Based on these considerations, this study aims to design and develop an Android-based game entitled Game Ngarit. The game is designed as an adventure-based educational game that introduces players to rice farming activities through a series of challenges and missions. The application was developed using Construct 2 as the game development platform and Adobe Photoshop CS6 for graphical asset creation. The resulting game is expected to serve not only as a source of entertainment but also as an educational medium that promotes awareness of agricultural activities and traditional farming culture among the wider community.

2. METHODS

This study employed a software development approach to design and implement an Android-based educational game entitled Game Ngarit. The development process consisted of system analysis, system design, interface design, implementation, and testing. The game was developed using Construct 2 as the primary game engine, while Adobe Photoshop CS6 was utilized for creating graphical assets and user interface components.

2.1. System Analysis

The system analysis stage was conducted to identify the functional requirements of the game and determine the interactions between users and the application. The objective of the game is to introduce players to rice farming activities through an adventure-based gameplay environment. Players are required to collect rice crops, avoid obstacles, and complete missions across multiple levels while achieving the highest possible score.

The analysis process focused on identifying user interactions, game navigation, scoring mechanisms, level progression, and supporting features such as instructions, settings, and high-score management.

2.2. Use Case Diagram

A Use Case Diagram was developed to describe the interactions between users and the game system. The diagram illustrates the functionalities available to users, including starting the game, selecting levels, viewing instructions, accessing settings, viewing high scores, and displaying information about the game.

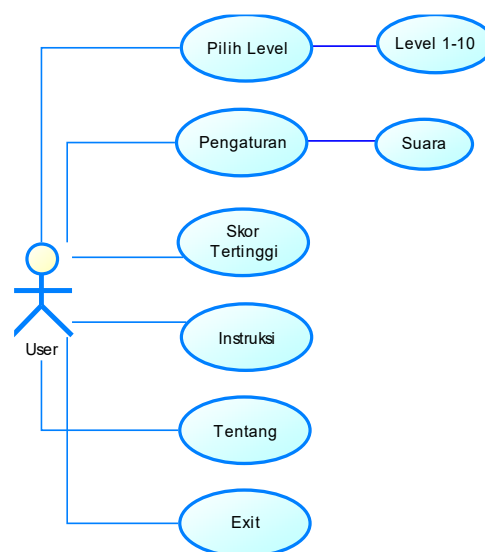


Figure 1. Use Case Diagram

The use case model serves as the foundation for defining system functionality and user interaction requirements throughout the development process.

2.3. Activity Diagram

The Activity Diagram was designed to represent the workflow and operational processes within the game. It illustrates how users interact with the main menu and navigate between different game features.

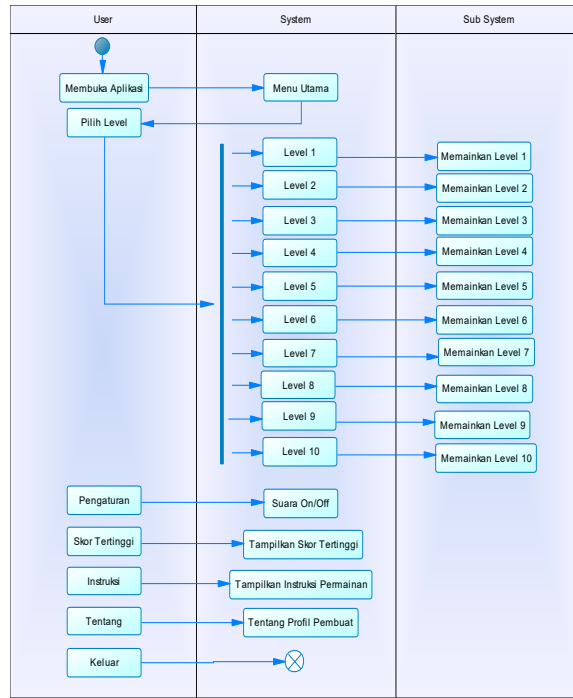


Figure 2. Activity Diagram of Main Menu

The activity flow begins when the user launches the application and accesses the main menu. From this interface, users may select available options such as Play, Settings, High Score, Instructions, and About. Depending on the selected option, the system executes the corresponding process and returns the user to the appropriate interface.

2.4. Sequence Diagram

Sequence Diagrams were developed to model the communication between system components during user interactions. These diagrams describe the sequence of events that occur when users access the main menu and interact with the available game features.

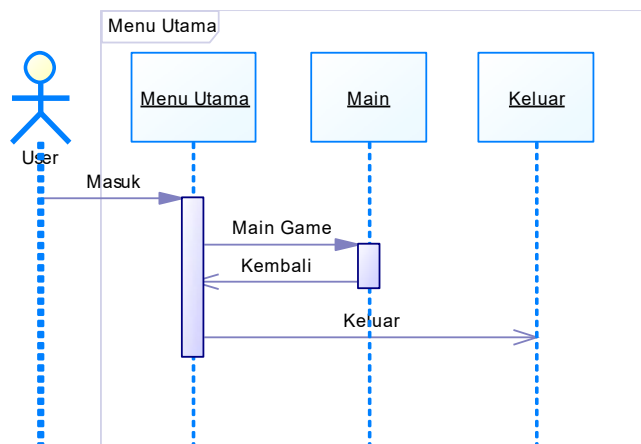


Figure 3. Sequence Diagram of Main Menu

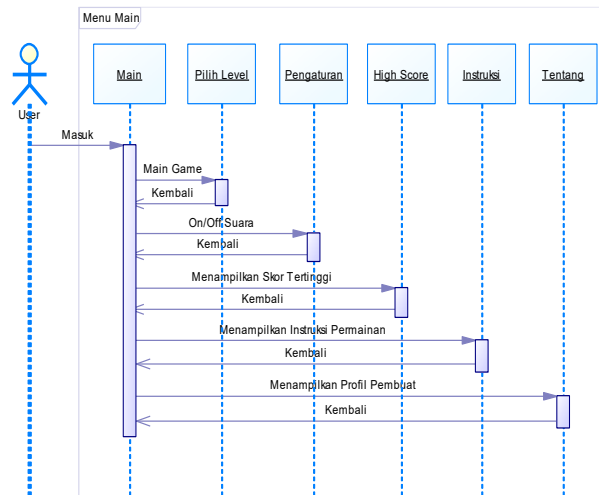


Figure 4. Sequence Diagram of Game Navigation

The sequence diagrams provide a detailed representation of message exchanges between users and the game system, thereby facilitating a better understanding of system behavior during runtime.

2.5. User Interface Design

The user interface was designed to provide an intuitive and engaging gaming experience. The interface consists of several screens, including the splash screen, main menu, level selection menu, settings menu, instruction page, and game information page.

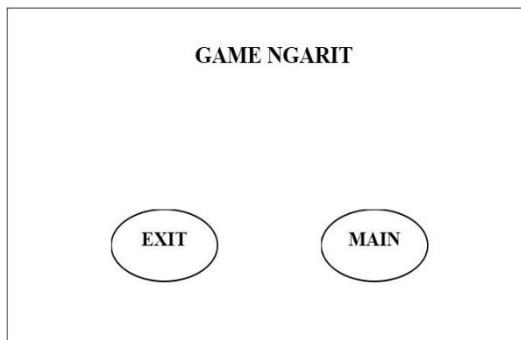


Figure 5. Main Menu Interface Design

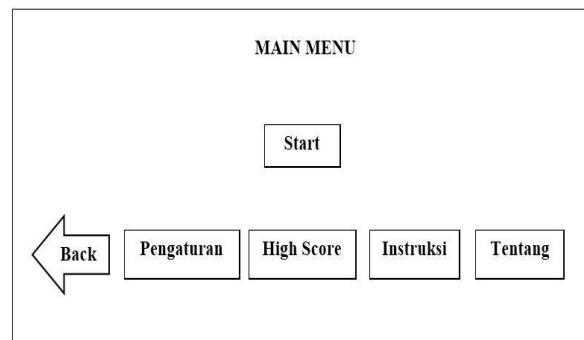


Figure 6. Game Navigation Interface Design

The interface design emphasizes usability and visual attractiveness to encourage user engagement throughout gameplay.

2.6. Game Development

The implementation phase involved the development of game mechanics, character controls, obstacle interactions, scoring systems, and level progression. Construct 2 was utilized to develop the game logic and gameplay functionality, while graphical elements were designed using Adobe Photoshop CS6.

The completed game consists of ten levels with increasing difficulty. Players are required to collect rice crops, avoid obstacles, and achieve the objectives defined for each level. Successful completion of a level allows players to proceed to the next stage, while failure requires them to replay the current level.

2.7. System Testing

System testing was conducted to evaluate the functionality and performance of the developed application. Two testing approaches were employed:

- Black Box Testing, which focused on verifying the functional requirements of the application and ensuring that all features operated according to the specified design.
- Beta Testing, which involved direct evaluation by end users through questionnaire-based assessment. The objective of this testing phase was to measure user satisfaction, usability, and overall acceptance of the developed game application.

The testing results were subsequently analyzed to determine whether the application fulfilled its intended objectives as an educational and entertainment medium.

3. RESULT

This section presents the results obtained from the implementation and evaluation of the Android-based Game Ngarit application. The results include system implementation, user interface realization, functional testing through Black Box Testing, and user acceptance evaluation through Beta Testing.

3.1. System Implementation

The developed application was successfully implemented on the Android platform using Construct 2 as the game development engine and Adobe Photoshop CS6 for graphical asset creation. The implementation stage transformed the system design and interface prototypes into a fully functional game application.

3.1.1 Main Menu Implementation

The main menu serves as the initial interface displayed when users launch the application. This page provides access to the primary functions of the game and serves as the central navigation hub.



Figure 7. Main Menu Implementation

The main menu was designed to provide simple navigation and facilitate user interaction with the game system.

3.1.2 Main Menu Navigation Implementation

The navigation menu provides access to several game features, including level selection, settings, high scores, instructions, and game information.

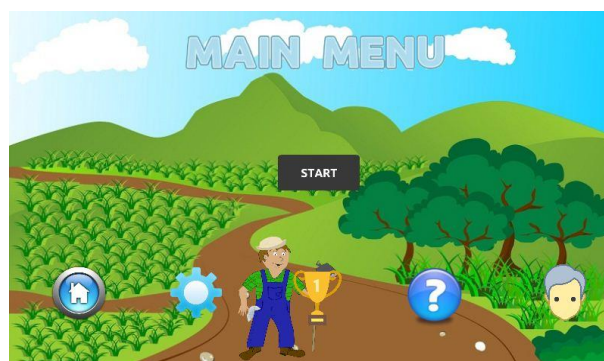


Figure 8. Main Menu Navigation Implementation

Through this interface, users can select the desired functionality before starting the gameplay process.

3.1.3 Level Selection Implementation

The level selection interface allows users to choose the available game levels according to their progress.



Figure 9. Level Selection Interface

Players must complete the current level before accessing the subsequent level. This mechanism encourages progressive gameplay and increases the challenge level throughout the game.

3.1.4 Gameplay Implementation

The gameplay interface represents the core functionality of the application. During gameplay, players are required to collect rice crops, avoid obstacles, and accumulate points within the allotted time.

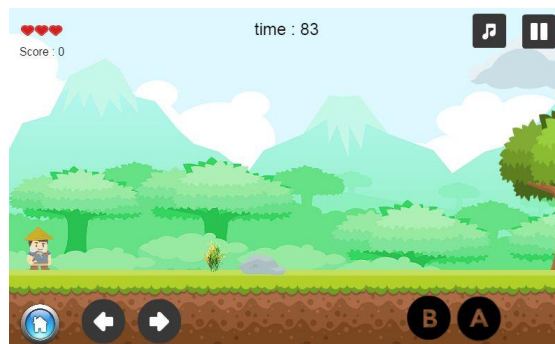


Figure 10. Gameplay Interface

The game consists of ten levels with increasing difficulty. Each level contains different obstacles and challenges designed to improve player engagement and maintain gameplay interest.

3.2. Black Box Testing Results

Black Box Testing was conducted to evaluate whether each system function operated according to the specified requirements. The testing focused on functional aspects without considering the internal program structure.

Table 1. Black Box Testing Results

Test Class	Test Scenario	Expected Result	Status
Application Startup	Launching the application	Display splash screen and main menu	Successful
Start Menu	Selecting the Play button	Display level selection menu	Successful
Instruction Menu	Selecting the Instruction button	Display game instructions	Successful
About Menu	Selecting the About button	Display game information	Successful

Test Class	Test Scenario	Expected Result	Status
Settings Menu	Selecting the Settings button	Display settings interface	Successful
Level 1–10	Playing and completing levels	Game functions correctly & records scores	Successful
Game Over	Failing to complete the level	Display game over notification	Successful

The testing results indicate that all system functions operated as expected. No functional failures were identified during the testing process, demonstrating that the application fulfilled its specified requirements.

3.3. Beta Testing Results

Beta Testing was conducted to evaluate user satisfaction and application usability. The evaluation involved 100 respondents selected using a simple random sampling approach. Data were collected through questionnaires distributed directly to users after interacting with the application.

3.3.1. Application Compatibility

The first evaluation assessed whether the application could run properly on users' smartphones. The results showed that all respondents successfully executed the application.

Table 2. Percentage Response Application

Response	Frequency	Percentage
Yes	100	100%
No	0	0%

These results indicate full compatibility of the application within the tested Android environment.

3.3.2. User Interface Design Evaluation

The second evaluation measured user perceptions regarding the visual design of the application.

Table 3. Percentage Response UI

Response	Frequency	Percentage
Good	45	45%
Fair	43	43%
Poor	12	12%

Most respondents rated the interface design as either good or fair, indicating an overall positive perception of the application's visual appearance.

3.3.3. Color Visualization Evaluation

The third evaluation assessed user satisfaction regarding color selection and visual presentation.

Table 4. Percentage Response Color Visualization

Response	Frequency	Percentage
Good	36	36%
Fair	59	59%
Poor	5	5%

The majority of respondents considered the color visualization acceptable and appropriate for gameplay.

3.3.4. Functional Performance Evaluation

The fourth evaluation examined whether all application components functioned correctly on users' devices.

Table 5. Percentage Response Functional Performance

Response	Frequency	Percentage
Yes	100	100%
No	0	0%

The results demonstrate that all tested application features functioned properly during the evaluation process.

3.3.5. Game Difficulty Evaluation

The fifth evaluation measured user perceptions regarding game difficulty.

Table 6. Percentage Response Game Difficulty

Response	Frequency	Percentage
Difficult	28	28%
Moderately Difficult	56	56%
Less Difficult	16	16%

Most respondents considered the game moderately difficult, suggesting that the challenge level was appropriate for the target audience.

3.3.6. Educational Value Evaluation

The sixth evaluation assessed whether the game could serve as a useful educational tool for improving children's agility and learning experience.

Table 7. Percentage Response Educational Value

Response	Frequency	Percentage
Yes	64	64%
Fair	24	24%
No	12	12%

The results indicate that most respondents perceived the application as beneficial and educational.

3.3.7. Publication Feasibility Evaluation

The final evaluation measured user perceptions regarding the overall feasibility of the application.

Table 8. Percentage Response Publication Feasibility

Response	Frequency	Percentage
Yes	100	100%
No	0	0%

All respondents agreed that the application was suitable for publication and public use.

3.4. Summary of Findings

The implementation and testing results demonstrate that the Android-based *Game Ngarit* application successfully fulfilled its functional requirements. All features operated correctly during Black Box Testing, while Beta Testing indicated positive user acceptance regarding usability, educational value, and overall application performance.

4. DISCUSSION

The primary objective of this study was to develop an Android-based educational game that introduces users to rice farming activities through an interactive gameplay experience. Based on the implementation and testing results, the developed Game Ngarit successfully achieved its intended objectives by combining entertainment elements with educational content related to agricultural practices.

The Black Box Testing results demonstrated that all major system functions operated according to the specified requirements. Features such as application startup, level selection, game navigation, settings management, instruction display, high-score functionality, and gameplay execution were successfully implemented without functional errors. These findings indicate that the system architecture and game logic were developed correctly and were capable of supporting the intended user interactions.

The successful implementation of all functional components also reflects the suitability of Construct 2 as a game development platform for Android-based educational applications. The platform provided sufficient flexibility for designing gameplay mechanics, level progression, scoring systems, and user interface interactions. Furthermore, the integration of graphical assets developed using Adobe Photoshop CS6 contributed to the visual quality of the application and enhanced the overall user experience.

The Beta Testing results further demonstrated positive user acceptance of the developed application. All respondents confirmed that the application could run successfully on their smartphones, indicating a high level of compatibility across the tested devices. This result is particularly important because application compatibility directly affects usability and accessibility in mobile gaming environments.

The evaluation of the user interface design revealed that most respondents perceived the visual appearance of the application positively. A combined percentage of respondents rated the interface as either good or fair, suggesting that the design successfully met user expectations. Similarly, the evaluation of color visualization showed that the majority of users considered the visual presentation acceptable and appropriate for gameplay. These findings indicate that the graphical design elements contributed positively to user engagement.

The assessment of game difficulty produced an interesting outcome. Most respondents categorized the game as moderately difficult, while a smaller proportion considered it difficult or less difficult. This result suggests that the game achieved a balanced difficulty level that was neither excessively challenging nor overly simple. Appropriate difficulty balancing is an important factor in game design because it helps maintain player motivation and prolong engagement throughout gameplay.

Another significant finding relates to the educational value of the application. More than half of the respondents agreed that the game could serve as a beneficial educational medium and contribute to the development of agility and cognitive skills. This result supports the concept of game-based learning, where educational content is delivered through interactive activities that encourage user participation. By integrating rice farming activities into the gameplay, the application provides players with an opportunity to learn about agricultural processes while simultaneously enjoying an entertaining experience.

The findings also indicate that the application has the potential to contribute to the preservation and promotion of local agricultural culture. Modern digital games are often dominated by themes related to fantasy, action, or sports, whereas agricultural themes receive relatively limited attention. The development of Game Ngarit introduces a culturally relevant theme that reflects traditional farming activities and may help increase public awareness of agricultural practices, particularly among younger generations who have limited direct exposure to farming environments.

Overall, the results demonstrate that the developed application successfully fulfilled its functional requirements and achieved positive user acceptance. The combination of educational content, interactive gameplay, and cultural themes makes Game Ngarit a promising digital medium for both entertainment and informal learning. Nevertheless, future development could incorporate additional features such as multiplayer functionality, achievement systems, more diverse gameplay mechanics,

and expanded educational content to further improve user engagement and learning effectiveness.

5. CONCLUSION

This study successfully designed and developed an Android-based educational game entitled Game Ngarit using Construct 2 as the game development platform and Adobe Photoshop CS6 for graphical asset creation. The application was developed to introduce rice farming activities to the public through an interactive and entertaining gaming environment. The game incorporates multiple levels, scoring mechanisms, obstacles, and educational elements related to traditional agricultural practices.

The testing results demonstrated that the application functioned properly according to the specified requirements. Black Box Testing confirmed that all system features operated successfully without functional errors. Furthermore, Beta Testing involving 100 respondents indicated positive user acceptance regarding application compatibility, interface design, gameplay functionality, and educational value. The majority of respondents considered the game beneficial as both an entertainment medium and an educational tool for introducing agricultural activities.

Based on the findings, Game Ngarit can serve as an alternative educational game that combines learning and entertainment while promoting awareness of rice farming culture. The application also demonstrates the potential of Android-based games as interactive learning media capable of delivering educational content in an engaging manner. Future development may focus on enhancing gameplay features, improving visual quality, implementing multiplayer functionality, and expanding educational content to increase user engagement and learning effectiveness.

REFERENCES

- [1] ASTM International, ASTM C125-95: Standard Terminology Relating to Concrete and Concrete Aggregates. West Conshohocken, PA, USA: ASTM International, 1995.
- [2] J. von Neumann and O. Morgenstern, **Theory of Games and Economic Behavior**. Princeton, NJ, USA: Princeton University Press, 1953.
- [3] N. Agustinus, **Pemrograman Animasi dan Game Profesional**. Jakarta, Indonesia: Elex Media Komputindo, 1998.
- [4] D. Lestari, "Information Technology," 2013. [Online]. Available: <http://www.ummi.ac.id>. [Accessed: May 5, 2017].
- [5] N. Safaat, **Aplikasi Mobile Smartphone dan Tablet PC Berbasis Android**. Bandung, Indonesia: Informatika, 2012.
- [6] S. Syamsiyah et al., **Membuat Game Android dengan Construct 2**. Jakarta, Indonesia: Pusat Perbukuan Departemen Pendidikan Nasional, 2008.
- [7] A. Taru Nugroho N. W., **Cara Mudah Membuat Game di Android**. Yogyakarta, Indonesia: Andi Offset, 2014.