# HAYO-FUN: An Android-based mobile application for raising farm animals

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As the proverb goes, without knowledge, action is useless, and without action, knowledge becomes futile. Socrates once remarked, "*To know that we know what we know, and to know that we do not know what we do not know*." Knowledge is indeed a valuable treasure that people can apply in their daily lives to improve their well-being. While knowledge derived from textbooks remains essential, students today often perceive it as insufficient or unappealing. They frequently turn to the internet for answers to their questions, yet learning through video games offers another promising avenue, one that combines engagement with education, making the acquisition of knowledge more interactive and enjoyable.

There are notable studies demonstrating the potential of educational games. Empirical findings revealed that using games as a learning medium produced positive educational outcomes among students (Alotaibi, 2024; Ren et al., 2024; Cheung & Ng, 2021; Smiderle et al., 2020; Yu et al., 2020; Barroga & Hipe, 2023; Abion et al., 2023). Hence, this study acknowledges

the immense potential of mobile games, which are particularly popular among teenagers, to serve as tools for promoting agricultural literacy. Through educational games, students can acquire essential agricultural knowledge in a way that feels less burdensome and more engaging than traditional learning methods. Unlike textbooks or online resources, which may feel tedious to those without a natural interest in agriculture, mobile games can make learning enjoyable by combining education with entertainment.

Although some critics argue that games distract students from meaningful learning (Rüth & Kaspar, 2021; Murphy et al., 2014), a broader perspective suggests that games and education do not have to exist in opposition. Instead, their integration can create a powerful, motivating, and enjoyable approach to learning, one that encourages learners to engage voluntarily rather than perceive it as an obligation. When thoughtfully designed, educational games can reinforce critical thinking, problem-solving, and collaboration skills, bridging the gap between theory and practice. Moreover, the immediate feedback and adaptive challenges inherent in well-structured games can foster a sense of competence and persistence, enhancing both learning outcomes and long-term retention.

The main objective of this study is to develop an educational game designed to teach players how to raise different types of farm animals and identify as well as treat common animal diseases. Specifically, the study aims to design an Android-based mobile game that enables players to raise farm animals from the initial stage to maturity, provides a list of treatments for common animal diseases, incorporates quizzes on diseases and medicines, features a trading market for buying and selling products, and displays player achievements alongside the developmental history of farm animals. Furthermore, the study intends to create this game using GDevelop

with C++ and JavaScript programming languages, and to evaluate it in terms of functionality, performance efficiency, compatibility, and usability.

## Theoretical Framework

### *Theory of Game-based Learning*

The study is anchored in the theoretical perspectives of The Theory of Learning in Games as articulated by Fudenberg (1998) and Levine (1998), who emphasized the potential benefits of utilizing games as a medium for learning. In line with this, Piaget (1962), the first psychologist to systematically investigate children's cognitive development, argued that the growth of a child's intelligence is significantly influenced by the environment and the activities in which they regularly engage, particularly play. Supporting this argument, Abt's (1970) Theory of Serious Games posits that such games are intentionally designed with explicit educational objectives rather than being created solely for amusement. Similarly, Plass (2015) stresses that an integrative approach, one that combines cognitive, motivational, affective, and sociocultural perspectives, is essential in both game design and game research to fully harness the educational potential of games.

Building upon these theoretical underpinnings, the present study incorporates educational principles into a game format while ensuring that entertainment remains central to the learning experience. This balance ensures that learners are both motivated to engage and able to acquire knowledge in a meaningful way.

### *Gamification in Agriculture: Enhancing Knowledge and Engagement through Mobile Technology*

Agriculture, encompassing the cultivation of crops and the raising

of animals, represents a cornerstone of both local and global economies. Individuals engaged in this sector, commonly referred to as farmers, play a critical role in sustaining livelihoods by providing food, employment, and essential raw materials, while also contributing to economic growth through trade. Among the diverse branches of agriculture, livestock production and selective breeding, commonly referred to as animal husbandry, stand out as vital activities aimed at enhancing genetic qualities and behavioral traits for economic benefit. For many farmers, animal husbandry serves as a primary source of livelihood.

According to Rajinipriya et al. (2018), agriculture is one of the most vital sectors influencing government policy and economic planning. A robust agricultural system enables a nation to achieve self-sufficiency, reduce dependence on imported products, and stimulate economic development through trade, thereby alleviating poverty within local communities. However, as Madayag (2021) observes, the agricultural sector in the Philippines continues to lag behind other Asian nations in terms of technological advancement and access to modern equipment. This underperformance has been attributed to insufficient investment in both traditional and innovative agricultural practices.

Globally, livestock production is dominated by countries such as China, the United States, and Egypt (Global Economy, 2020). China leads in chicken and egg production, the United States specializes in cattle and beef, and Egypt is recognized for its large goat population, which supplies both meat and milk. For the Philippines to enhance its agricultural output, it is crucial to encourage greater engagement among its citizens, particularly the younger generation. Urrutia (2018) reports that the number of farmers in the country has been declining annually, as many choose to work overseas in pursuit of higher income opportunities. This trend highlights the

urgency of cultivating local interest in agriculture.

This study seeks to address these challenges by integrating mobile technology into agricultural education. By targeting younger generations, the research aims to foster early interest in agriculture while equipping learners with foundational knowledge. The objective is to impart essential agricultural concepts at an early age by incorporating entertainment elements, thereby ensuring sustained motivation and engagement.

Video games, defined as electronic games that require interaction through input devices such as controllers, keyboards, or joysticks, provide a versatile platform for recreation and learning alike. Mayra (2020) observes that video games, particularly mobile-based games, have become increasingly popular among adolescents due to their accessibility and widespread use. Leveraging this trend, researchers employ mobile games as innovative tools to promote agricultural literacy. Fatta (2018) emphasizes that gamified learning enables players to acquire practical knowledge, such as animal husbandry, while simultaneously experiencing intrinsic satisfaction through progressive achievements, thereby sustaining interest and long-term engagement.

Continuous advancements in mobile technology have further enhanced computing capabilities, making mobile devices powerful tools for learning. Mobile technology encompasses not only portable devices but also two-way communication systems, computing hardware, and supporting network infrastructure. Leveraging these developments, the present study introduces a novel approach to agricultural education through mobile gaming, enabling young learners to acquire foundational agricultural knowledge in an interactive and engaging way, with the ultimate goal of translating in-game learning into real-life applications.

***Game-based Learning Systems***

Game-based learning is an active instructional strategy that employs games to enhance student learning outcomes. In this approach, learners acquire knowledge by interacting with game environments, which foster critical thinking and problem-solving skills. Game-based learning can be implemented using both digital and non-digital games and simulations, enabling students to experience concepts in an interactive, experiential manner.

One notable example is FarmVille, an agricultural simulation game developed and published by Zynga in 2009. Its gameplay incorporates multiple aspects of farm management, including plowing land, planting crops, cultivating trees, and raising livestock. The game is distinguished by high-quality graphics and interactive mini-games, which sustain player interest over time. By adopting similar design principles, the researchers aim to ensure that their game maintains user engagement while supporting educational objectives.

While entertainment is a crucial element, the educational dimension of the game is equally important. For instance, incorporating quizzes at each milestone can provide cognitive challenges and reinforce learning opportunities. This concept is exemplified by Kahoot!, a Norwegian game-based learning platform launched in 2013, which utilizes user-generated multiple-choice quizzes accessible via web browsers or the mobile application. By combining knowledge testing with interactivity, Kahoot! demonstrates how games can effectively support education.

Research further suggests that educational games focusing solely on content delivery risk diminishing adolescent engagement. To counter this, effective game-based learning integrates challenging tasks with entertainment, thereby sustaining motivation while promoting knowledge

acquisition. Drawing upon these established concepts and design strategies from existing games, the researchers have identified sufficient theoretical and practical foundations to guide the development of their own educational game.

## Research Framework

### *Data*

***Related games.*** After analyzing existing games available in the app store, the researchers identified relevant data that served as the foundation for the development of their own game. Specifically, they reviewed popular farming and learning games to understand their mechanics and features. These insights provided the basis for designing a farming game that integrates quizzes about animals, aligning with the study's educational objectives.

***Information about animals.*** Before developing the game on raising farm animals, the researchers gathered detailed information on how each specific animal is raised. This step ensured that the educational content of the game was accurate, relevant, and reflective of real-world practices in animal husbandry.

***Information about GDevelop.*** As the researchers were new to game development and had no prior experience with GDevelop, they first studied the tool to become familiar with its features and functionalities. Through trial and error, they gradually acquired the necessary skills and knowledge to effectively use GDevelop, eventually gaining the competence to begin the actual development of their project.

***Game assets.*** The researchers also collected and created the graphic and audio assets required for the game. They sourced images online and

edited them to ensure suitability for their design. In addition, appropriate sound effects were selected to enhance player engagement and improve the overall quality of the game. With these assets in place, the researchers were able to proceed with game development, guided by the problem identified in their study.

### *Experimental Design*

The experimental design employed in this study examined the effect of an independent variable (treatment) on a dependent variable (learning outcomes and engagement). By implementing two treatments and comparing the results, one group using the developed game and another taught through traditional methods, the researchers aimed to achieve maximum precision and draw specific, evidence-based conclusions for the study.

**Table 1**

*Treatment A*

| Factor | Level | Response |
|---|---|---|
| Based on reality | HIGH - The time for animals to grow is also based in real time. | The players will lose the interest to play the game because of the grinding time needed to make every animal they have grown. |
| Game rewards | HIGH - Large sum of rewards will be given for each mission achieved. | Even if the game rewards are generous if the time needed for them to achieve these missions is so long it will become not worth it. |

**Table 2**

*Treatment B*

| Factor | Level | Response |
|---|---|---|
| Based on reality | LOW - The time for animals to grow is fast unlike in reality. | The game difficulty decreased but the game reward also needed to decrease because the player may end the game immediately and result in losing interest in the game also. |
| Game rewards | LOW - Small amount of rewards will be given for every achievement. | Because the game is not highly based in reality |

Having the game highly based on reality can increase the education the players can learn but they will lose the interest eventually because of game difficulty. But if the game id too easy for players, it will decrease the knowledge players can learn from the game. Based on results, the researchers need to balance these two variables to avoid these scenarios and achieve the best result of their study.

### *Ethical Consideration*

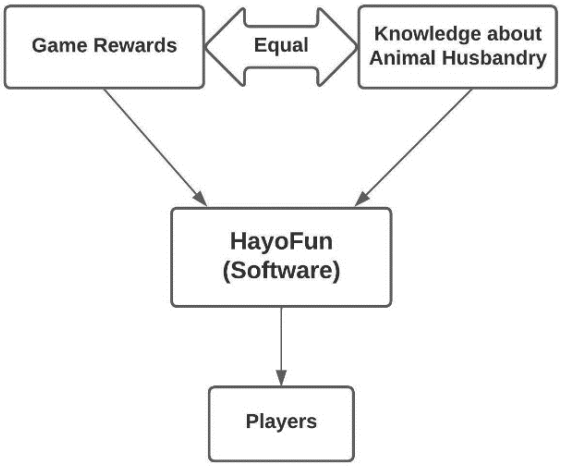
The researchers adhered to a set of ethical principles throughout the study. Prior to gameplay, they obtained informed consent from all participants. Potential risks or harms to the players were identified and mitigated to ensure safety. The confidentiality of participants was strictly maintained, and any conflicts of interest were carefully managed. Throughout the study, the well-being of the players was prioritized to ensure an ethical and responsible research process.

### *Modeling*

The model in Figure 1 illustrates the goal-directed simplification of the study. Through this visual representation, the purpose, variables, and overall system process can be clearly and effectively demonstrated.

**Figure 1**

*Modeling*




The two primary variables of the study are game reward and knowledge about animal husbandry. These variables must be carefully balanced to prevent potential negative effects on the outcomes of the study. Once the appropriate balance between these two variables is achieved within the developed software, HayoFun, the intended impact will be directed toward the Players, who serve as the target sample of the study.

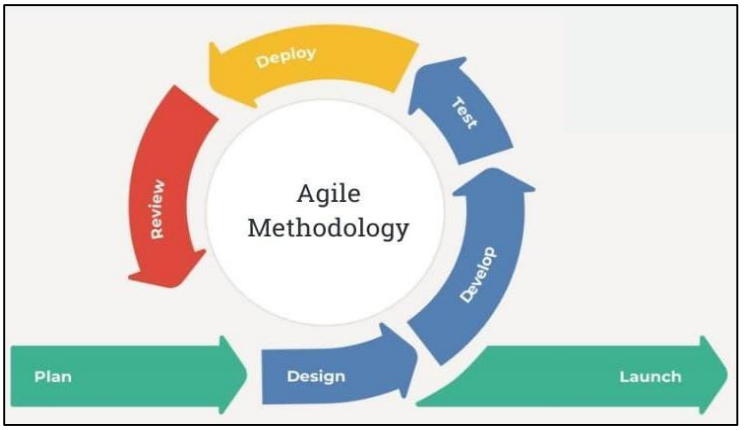
### *Procedures of the Different Phases*

The study used an Agile Methodology approach to keep progress and achieve positive results. The Agile methodology is a way to manage a project by breaking it up into several phases. It involves constant

collaboration with stakeholders and continuous improvement at every stage. Once the work begins, teams cycle through a process of planning, executing, and evaluating.

**Figure 2**

*Agile Method*




***Plan.*** In this stage, the researchers initiated the development of the system by carefully planning and analyzing the variables necessary for the project. This included identifying the data to be gathered, the scope of the game, and the objectives to be achieved. Proper planning served as the foundation for ensuring that the game development process was systematic and aligned with the study's goals.

***Design.*** The researchers then proceeded to design the game, titled HayoFun. This phase involved creating graphical layouts and conceptualizing how basic knowledge of animal husbandry could be applied within the game. All relevant variables that could influence gameplay and educational outcomes were considered and integrated in a manner that would best support the study's objectives.

***Develop.*** During the development phase, the researchers utilized the

GDevelop engine, a free and open-source 2D cross-platform tool primarily used to create PC, mobile, and HTML5 games. The game was subjected to multiple rounds of testing to identify and resolve bugs, with continuous iterations and improvements made based on development progress. These refinements ensured that the application operated efficiently and provided a smooth user experience.

***Test.*** This stage involved systematically testing the software product to verify that all components functioned as expected. The game's code and features were repeatedly tested and adjusted to ensure stability and seamless operation. Continuous iterations were made to address issues promptly and enhance the overall quality of the game.

***Deploy.*** In the deployment phase, the researchers selected beta testers to play the game. Beta testing provided a valuable opportunity to identify bugs, usability concerns, and other issues that may not have been detected during internal testing. Since real users interact with the game in authentic contexts, beta testing offered insights that more closely simulated real-world application.

***Review.*** After beta testing, the researchers collected feedback from the testers. This process enabled the identification of areas requiring improvement and refinement. The feedback served as a critical tool for ensuring that the final product aligned with user expectations while meeting the educational and entertainment goals of the study.

***Launch.*** Once the necessary revisions had been made and the game achieved the set objectives, the researchers prepared it for launch. The game was released publicly outside of Google Play and distributed through shareable online links, making it accessible to the target audience.

## Technical Framework

### *Hardware Specification*

The researchers utilized an available computer to develop the game. Since the game editor they selected was accessible online, it was convenient to use, allowing them to easily access and edit the game at any time. This also minimized the risk of file loss, as assets needed for the game were uploaded directly into the platform. In addition to computers, mobile devices were employed in certain stages of the development process. Mobile applications were used to edit some of the graphic art, as these tools proved to be more efficient and user-friendly compared to computer-based software. Furthermore, mobile devices were essential for testing, as the final product was intended to be published as a mobile game.

### *Software*

***GDevelop.*** The primary tool used for development was GDevelop, an online game maker that provided all the necessary features for the project. GDevelop is a 2D cross-platform, open-source engine designed for creating PC, mobile, and HTML5 games. Since the researchers had limited prior knowledge of game development, they searched for an engine that was both accessible and compatible with their needs. Given the popularity of mobile gaming among teenagers, the researchers chose to publish the game on mobile platforms, making GDevelop an ideal choice.

***Fotor Online Photo Editor.*** To edit the graphics incorporated into the game, the researchers used Fotor, an online photo editor. Fotor provided a variety of tools that were instrumental in creating and enhancing the game's visual elements. This free photo editor offers both standard image editing functions and specialized features such as AI photo effects, HDR

adjustments, and RGB editing, which allowed the researchers to design high-quality graphic art for the game.

***BG Remover.*** The researchers also employed BG Remover as a supplementary tool in editing images. Its primary function is to remove image backgrounds, rendering them transparent. When used alongside Fotor, BG Remover ensured that the graphics met the quality standards required for integration into the game. Together, these tools enabled the researchers to produce polished and professional-looking game assets.

***Font Meme.*** Another tool used was Font Meme, an online font generator capable of producing unique text designs. The researchers used this tool to customize the in-game text, including titles and interface elements. Font Meme also allows the addition of glow effects and styling features, which were particularly useful in designing hover buttons and enhancing the visual appeal of the game.

### *Requirement Analysis*

Requirement analysis, also referred to as requirement engineering, is a process used to determine the needs and expectations of a new product. Before identifying specific requirements, it is necessary to define the key stakeholders and end-users. In this study, the key stakeholders are the researchers themselves, as they serve as the developers and owners of the product. The end-users are youths aged 12 and above, who represent the target audience of the game.

Once the stakeholders and end-users were identified, the researchers gathered and categorized the requirements into functional requirements (describing what the game should do) and technical requirements (describing the hardware and software specifications needed to support the game). Table 3 presents these requirements in a categorized format.

**Table 3**

*Functional requirements*

| Functional Requirements | Description |
|---|---|
| Game Player | The actual human that plays the game. |
| User Input | Functional mechanism to control the direction and action of a player. |
| User Interface | Medium of interaction between players and the game. Consist of a set of screens and visual elements in the game. |
| Gameplay Character | Set of characters that are being controlled by the player or the game itself. It consists of player character, enemy character or dynamic object modeling. |
| Rigid Modeling | Set of characters that are not affected by any forces, collision or gravity during the gameplay. |
| Media Content | Medium for immersion and engagement such as music, sound effects and animation. |
| Structural Functionality | Requirements that form the base of the game and coordinate the elements such as scene management, rendering, collision detection and physical systems. |
| Rewarding System | Motivational aspect includes points, badges and achievements for completing the game. |

**Table 4**

*Technical requirements*

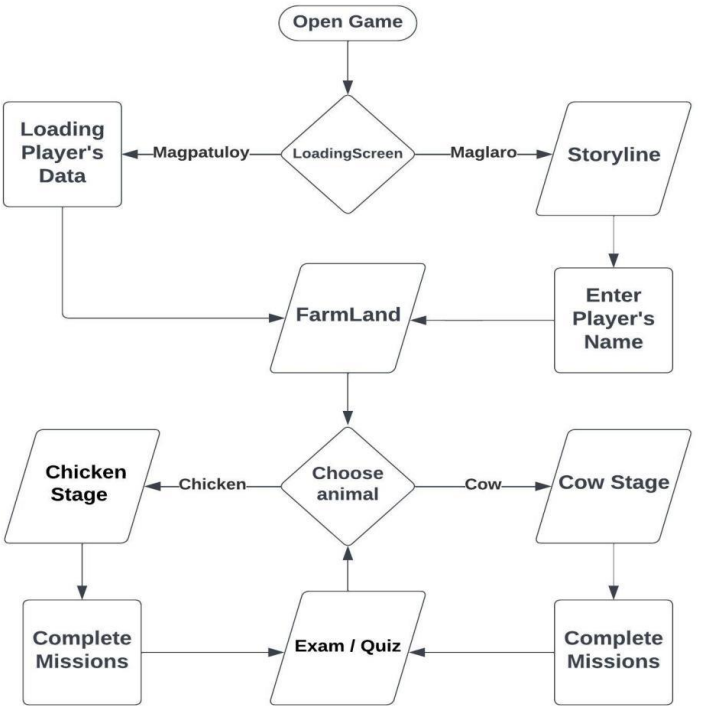
| Technical Requirements | Description |
|---|---|
| >2GB RAM | The minimum requirement for the game is having the device's 2gb RAM. The game may not work if a device has slightly less than 2gb RAM. |
| Dual Core Processor | The minimum requirement for the game is having the device dual core at least. |
| Android 4.4 (KITKAT), API 19 | The minimum requirement for the game is having the device software updated up to Android 4.4. |
| Open WEBGL Support | Common requirement for games that is created from GDevelop to ensure that the game is working properly. |
| Screen Size | The minimum requirement for screen size is 1920 x 1080 for good gaming experience. |

***System Design***

Figure above (Figure 4) illustrates the flow of the game. The game began with the players choosing whether to continue an existing game or create a new one.

**Figure 3**

*System flowchart*




If the players selected to create a new game, a short storyline appeared, after which they were required to input a name before starting. Players then choose between two available animals, cow or chicken, to begin their gameplay. Once the initial animal was selected, players were tasked with completing all missions to unlock additional features such as buying and selling. The Talaan feature was also unlocked after mission

completion. This feature was essential as it served as a library where the latest information about the unlocked animal could be accessed. Players were expected to study and review the contents of this library since the quiz questions were drawn from the topics found there. To progress in the game and unlock the second animal, players first needed to achieve a satisfactory score in the quiz.

### *Development*

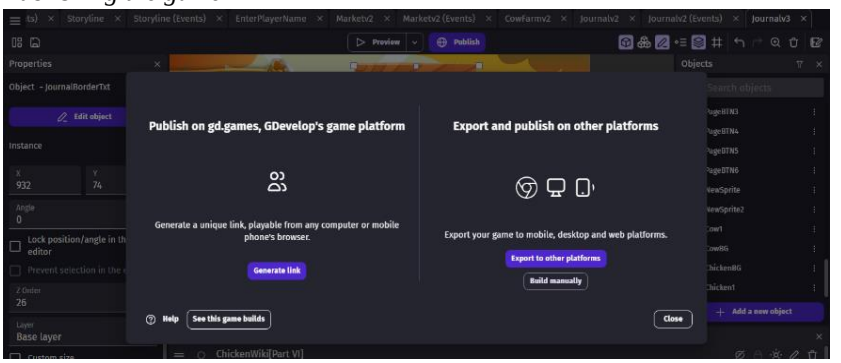
In terms of development, the researchers continuously uploaded new updates and added new animals to the game. They also addressed bugs that appeared in each patch. Through this process, the researchers maintained the game's functionality and sustained player engagement.

### *Deployment and Maintenance*

The actions undertaken by the researchers to deploy and upload new content into the game are outlined in the following sequence.

**Figure 4**

*Publishing the game*

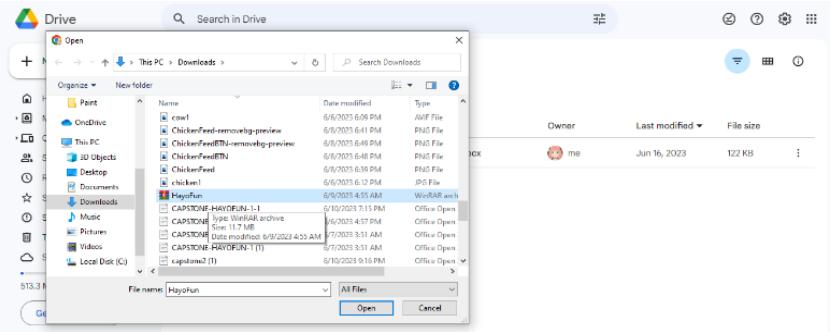



***Sequence 1: Publishing the Game.*** After the researchers completed the development of the game, they proceeded with its publication.

GDevelop provides two publishing options: one through the Google Play Store and the other outside of Google Play. The researchers opted for the latter and published the game independently, making it accessible outside the Google Play Store.

**Figure 5**

*Uploading to GDrive*




***Sequence 2: Uploading to Google Drive.*** Figure 6 illustrates the subsequent actions taken by the researchers to deploy the game. After publishing the game outside the Google Play Store, the researchers uploaded it to Google Drive and modified the share settings to "Anyone with the link," ensuring that the game was accessible and downloadable by all users.

***Sequence 3: Sharing the Link.*** Finally, the researchers promoted the game through social media platforms, leveraging their popularity to reach a wider audience. To attract players, they used engaging taglines and compelling quotes designed to encourage downloads and active participation in the game.

### *Evaluation of the System*

***Opening screen.*** Figures 6 and 7 illustrate the initial screens

displayed to players upon opening the game. If the game had just been installed and no previous data existed, the interface displayed the layout shown in Figure 6. However, if the player had previously played the game and saved progress, the display shown in Figure 7 appeared instead. The New Game button allowed players to create a new game progress, while the Continue button enabled them to resume a previously saved game.

**Figure 6**

*Newly installed*


**Figure 7**

*Game already played*

**Figure 8**

*Storyline*


***Storyline.*** Figure 8 illustrates the scene that appeared when players selected the New Game button. A storyline was presented, depicting a boy who lost his parents at an early age and was required to manage his family's farmland. Before he could fully take ownership of the farm, the boy needed to learn how to raise the farm animals. Players were given the option to skip the storyline by clicking the Skip button located at the top of the screen.

## *Entering Player's Name*

**Figure 9**

*Enter player's name*

Figure 9 shows the scene where the players need to insert a name that will be used in the entire game.

**Figure 10**

*Farmland*


***Farmland / Bukirin.*** In the farmland section, players could access the animals they were tasked with raising, as well as interact with Uncle Teddy, who administered quizzes and facilitated the unlocking of additional animals. At the start of the game, players were given the freedom to select which animal they wished to raise first.

**Figure 11**

*Chicken tutorial*

***Chicken tutorial.*** Figure 11 illustrates the scene that appeared when the player chose to unlock the chicken first. The game guided players on how to raise the chicken and how to sell it in the market. Upon completing the assigned missions, additional features were unlocked, including the market, journal, achievements, and access to quizzes administered by Uncle Teddy, which allowed players to unlock the second animal.

**Figure 12**

*Cow tutorial*


***Cow tutorial.*** Figure 13 illustrates the scene that appeared when the player chose to unlock the cow first. The game guided players on how to raise the cow and how to sell it in the market. Upon completing the assigned missions, additional features were unlocked, including the market, journal, achievements, and access to quizzes administered by Uncle Teddy, which enabled players to unlock the second animal.

***Journal / Talaan.*** After players completed all the missions, this feature was unlocked, providing access to all the information about the animals they had recently raised. This section proved particularly helpful

for players preparing to take quizzes in order to unlock the subsequent animals.

**Figure 13**

*Journal / Talaan*


**Figure 14**

*Market / Tindahan*


***Market / Tindahan.*** In the market section, players were able to sell matured animals and purchase additional feed for their livestock. This feature enabled players to earn in-game currency, which was essential for progressing and continuing gameplay.

**Figure 15**

*Achievements / Nakamtan*


***Achievements / Nakamtan.*** Figure 15 illustrates the features that were unlocked after a player completed a mission for a particular animal. Players could earn additional rewards upon successfully accomplishing all assigned tasks.

**Figure 16**

*Uncle Teddy (Minigame)*


***Uncle Teddy (Minigame).*** Figure 16 illustrates the section where players could take daily quizzes to earn additional rewards, which could be used to support the raising of animals. This section also served as the

location where players needed to complete quizzes in order to unlock subsequent animals.

### *System Evaluation*

The study employed a Four-Point Likert Scale consisting of the following categories: strongly agree, agree, disagree, and strongly disagree, which served as the response options for each survey question. Each scale point was assigned a specific mean range to facilitate the evaluation of the developed system.

**Table 5**

*Weighted mean distribution of the criteria for developed system*

| Criteria | Weighted Mean | Remarks |
|---|---|---|
| Functional Suitability | 3.95 | Strongly Agree |
| Performance Efficiency | 3.57 | Strongly Agree |
| Compatibility | 3.95 | Strongly Agree |
| Usability | 3.35 | Strongly Agree |
| **Average** | **3.71** | **Strongly Agree** |

Table 5 shows the result weighted mean of each term based on ISO 25010 gathered from 50 respondents. The result of the systems evaluation survey is a 3.71 average weighted mean. The survey results indicate that respondents were generally satisfied with the developed game across all evaluated criteria. In terms of functionality suitability, the game effectively supported players in raising farm animals, accessing the library, using the information in quizzes, and unlocking additional content. This demonstrates

that the game met its intended functional objectives, allowing for meaningful interaction and engagement. Performance efficiency was also rated positively, as the game operated smoothly despite minor bugs, saved progress accurately, and allowed players to recover lost data, ensuring uninterrupted gameplay. Compatibility received strong agreement, with respondents noting that the game ran reliably across different mobile devices and Android versions, including both older and newer models, indicating high adaptability and accessibility. Usability, while generally satisfactory, showed some room for improvement, particularly regarding the user-friendliness of the interface; however, respondents confirmed that buttons and sound interfaces functioned properly, supporting effective interaction. Overall, the weighted means for all criteria ranged from 3.35 to 3.95, with all categories falling under Strongly Agree, indicating that the developed game successfully met its functional, performance, compatibility, and usability goals, providing a reliable and engaging learning experience.

***Economic feasibility.*** Economic feasibility assesses whether the anticipated benefits of a system outweigh its projected costs, thereby determining the value and viability of the application. In this study, the developed game demonstrated high economic feasibility. The game was created using a free platform, GDevelop, and the researchers only required knowledge of the game maker and a reliable internet connection. Compared to other systems that may require paid software or extensive technical resources, this approach provided a cost-effective solution without compromising the quality and functionality of the game.

***Operational feasibility.*** Operational feasibility evaluates whether a system can be effectively used by its intended users. Survey results indicated that the game was operationally feasible and user-friendly.

Respondents reported that the system was easily understandable, and only a brief demonstration was needed for players to navigate and interact with the game efficiently. This suggests that the game can be successfully implemented with minimal training, making it accessible to its target audience of young learners.

***Technical feasibility.*** Technical feasibility examines whether the system can be developed using the available tools, resources, and expertise. The game was successfully developed using GDevelop, which requires no prior programming knowledge. Beginners can learn to use GDevelop effectively through the tutorials provided, ensuring that the development process is technically achievable. Additionally, the researchers' understanding of graphic design was essential, as the visual quality of the game depended heavily on the graphics and images integrated into the gameplay. These factors collectively confirmed the technical feasibility of the project.

## Conclusion

The study developed an Android-based mobile game that allowed players to raise farm animals from the initial stage to the final stage. The game included a library feature providing detailed information on common animal diseases and their corresponding treatments. A quiz feature was incorporated to assess players' knowledge and reinforce learning. The market feature enabled players to sell matured animals and purchase necessary items such as feed, supporting continuous gameplay. Additionally, an achievement system rewarded players for reaching milestones, thereby enhancing engagement and motivation.

Following testing and evaluation, the game met the standards

outlined in ISO/IEC 25010. It demonstrated high performance across key criteria, including functional suitability, performance efficiency, compatibility, and usability. These results indicate that the developed game not only functions effectively but also provides a reliable, engaging, and accessible learning experience for its users.

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