DESIGN OF GAME-BASED LEARNING DEFEND THE COUNTRY USING ROLE PLAYING GAMES MECHANISM

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ABSTRACT

Nowadays, it is undeniable that smartphones have been widely used by all levels of community, including children. Besides being used for communication media, smartphone is also used as a media for digital games. There are various forms of digital games, one of which is game based learning. Learning using video game media is an alternative learning method which has been applied at outside school, but it has not been accommodated by formal education. In our research, we try to combine the learning process with video game games in studying defend the country with the type of Role-Playing Games (RPG). Based on the calculating results from initial conditions of players, it was obtained a value of 75.88% in the pretest phase and there was an increase with a value of 12.88% to 88.75% in the middle test through traditional learning methods, and had increased by 17% to 92.88% at the end of evaluation by game learning methods. Furthermore, analysis towards the performance of this game obtained a total average value of 87% from five aspects that had been tested. In addition, it would facilitate students to study independently, thus maximizing the time available for elementary school students to study and increase character values for being better in the future.

Keywords: *Game Application, Learning Media, Game-Based Learning, Role Playing Games, Defend the Country*

1. INTRODUCTION

Nowadays, it is undeniable that smartphones have been widely used by all levels of community, including children. Besides being used for communication media, smartphone is also used as a media for digital games. There are various forms of digital games, one of which is game based learning. Learning using video game media is an alternative learning method which has been applied at outside school, but it has not been accommodated by formal education. Schools as learning centers have actually made various efforts to provide understanding related to State Defense material, one of which is from Citizenship Education subjects, but in practice students' understanding of State Defense learning still needs to be further improved on more effective learning methods and media. adapting to the digital era as it was at that time [1].

State Defense learning through Civics subjects is found in every educational unit and will be more effective if the dissemination process is included in the education curriculum in Indonesia which is explicitly studied internally. The results of the dissemination with the adaptation of the educational curriculum that are adapted to technological developments are expected to make the resonance of the State Defense movement have a maximum effect [2].

Based on the policy of the Ditjen Pothan (Directorate General of Defense Potential) of the Ministry of Defense of Republic of Indonesia, as stated in Permenhan (Ministry of Defense' Regulations) No. 1 of 2022, concerning the national defense policy for 2022, with the background, The implementation of national defense, is guided by *Sishankamrata* (the Universal People's Defense and Security System) by involving all citizens, territories and other national resources. *Sishankamrata* was prepared early by the government and carried out in a total, integrated, directed and continuous manner to uphold state sovereignty, territorial integrity and safety of the entire nation from all threats characterized by democracy, universality and territoriality by paying attention to aspects of strategic environmental development [3]. The basic elements of defending the country are divided into five points, including

the following: 1. Love for the motherland. 2. National and state awareness. 3. Believe in Pancasila as the state ideology. 4. Willing to sacrifice for the nation and state 5. Have the initial ability to defend the country.

For this reason, a strategy and innovative model are needed so that it is able to attract the attention and activeness of students in the learning process. For this reason, an innovative learning model is needed that is interesting and able to train students to be more active and creative in carrying out learning activities [4]. Building national character through civic education is an obligation because education not only makes students smart, but also has noble character whose presence in society becomes more meaningful [5]. Therefore, through citizenship education students can be instilled with the habit of recognizing good things, good manners so that they can understand, live and do this continuously in living their lives as a society and citizen [6]. Furthermore, regarding the approach that must be developed in Civics learning also includes various innovations that include learning materials, resources, and methods.

Playing games is something that is enjoyed by all people, regardless of age and social status. But the highlight is when the game is played by elementary school children. Elementary school children are children who still need full supervision by parents and the community around where they live. This research is focused on conveying messages about the implicit understanding of nationalism and State Defense and is packaged in a digital game with the concept of Game-Based Learning (GBL). Previous research by Mertika and Dewi (2022) stated that the positive impact of playing games is to facilitate learning, to focus more on lessons, to train patience, to train teamwork [7]. From this research it can be seen that games do have a positive impact on the way children think.

On the one hand, game-based learning involves interactive media for students to play an active role in it, with the widespread use of digital technology, children and young adults are seen playing games more often and longer on digital devices. How should teachers take advantage of the advantages of games in the classroom with conclusive results in implementing game-based learning, especially in basic education [8]. With the rules that exist in the game and scenarios that are very supportive, it will be very suitable. It will be very good if game-based learning is run in games with Role Playing Games (RPG) consoles.

Traditional environment is considered unattractive, which can create a boring environment and cause students lack of motivation to learn. With game learning as an alternative, it is expected that the educational environment will become interesting and attractive and more students willing to involve in challenges with the learning context. In order to help teachers in clarifying about the subject and easily to understand by students, they need learning media. Media can be functioned as a bridge to convey information from teachers to students appropriately. The use of media in the form of props, namely as a bridge or visualization to understand abstract concepts. It is expected that by using media in the learning process, students will be motivated, happy, and interested in learning process. However, this teaching aids will fail if the abstract concept of the concrete representation is not achieved [9]. One of the learning media that is considered effective is to use learning games as learning strategies and models that can affect the creative thinking process of students, this is in line with the concept revealed by [10], that the selection of inappropriate learning strategies can disrupt the thinking process of students. students, one of which is in the habit of creative thinking processes.

Learning Games can provide fun, guidance, and motivation [11]. Learning games can be used as learning media. Several studies have also been carried out using Game-Based Learning rules as the basis for making a game, creating RPG adventure games based on learning systems [12].

There are several types of games, one of which is Role Playing Games (RPG). RPG is a game in which a person enters into a role and the world, then he/she is given the opportunity to participate and interact with other characters including Non-Playable Characters (NPCs) which are part of the game world contents [13]. In this game world, there are characters, storylines, enemies, challenges and moral values to be conveyed. Role Playing Games do not assess the player whether they are win or lose, but only socialize with the world in the game instead of competing. Another benefit of Game Learning makes learning easier due to playing activities. Data which was generated by players to improve learning outcomes can be used as an alternative to learning as well as an evaluation process for the analysis of learning process. In addition, the Video Game-based learning approach shows that students who had accomplished their tasks in games have a significant impact on better understanding of improving social skills and good collaboration in teams [14]. Based on this description, this study aims to determine the implementation of designing a game-based learning

about defending the country based on a role-playing game mechanism.

2. RESEARCH METHODOLOGY
2.1. Game Development

This research was based on the software development process, namely the System Development Life Cycle (SDLC). SDLC is the process used to design, develop, and test the high-quality software.
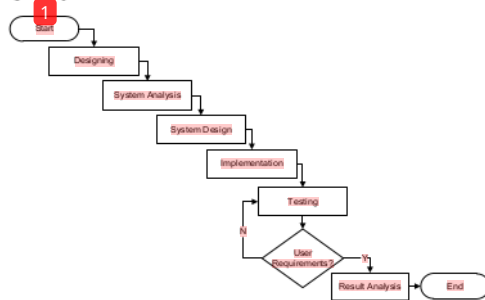

Figure 1. The development steps of Waterfall Model

The goal of SDLC is to provide a structured flow to produce high-quality software that meets user expectations, software life cycle model and comparing its performance [15], one of the most important phases of SDLC is the quality assurance phase or testing phase [16] with the type of game Role playing games (RPG). From its statement, if the contextual students' problem-solving skills, especially in mathematics that want to increase. The key points and architecture of the system are illustrated, as shown in Figure 2 below.
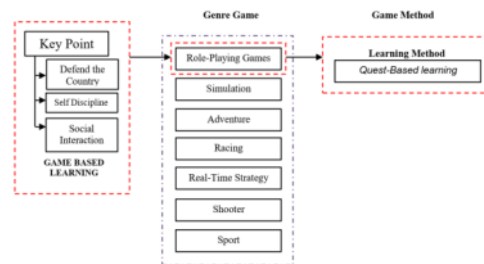

Figure 2. Research Concept Framework

Table 1. Learning Topic on Game

No.	Topic	Implementation
1.	Defend the Country	- Task 1 Learning About the History of the Struggle of the Indonesian Nation
		- Task 2 Learning About the Four Basic Consensus of the State in the National Movement for Defending the Country
		- Task 3 Learning About the Basic Level of State Defense
		- Task 4 Learning About Sishanta in the National Defense Movement
		Learning events about knowledge of good citizenship in common.
		- Using Fiction of Storylines
2.	Social Interaction	- NPC Interaction
		- Economic Activity
		- Adventure Activity
		- Quest
3.	Self-Discipline	- Family Activity
		- Self Activity
		- Meet Friends (NPC)

players have an interaction level with the game world in which there are quests as the basis of learning process. The quest factor comes from the NPC contained in the game world and the NPC will give a reward as a sign that the quest has been successfully carried out. Those rewards are used to assist the player in completing the game. The system development design for implementation with the Role-Playing mechanism can be seen in the figure 3 Below.
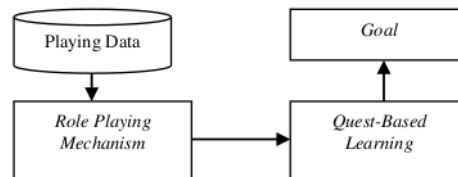

Figure 3. System Development Design

The initial process is to create game data. The data will be used as criteria and sub-criteria to be processed in the Role-Playing Mechanism. the basis of success is to complete targets based on the Quest-Based Learning method is blending the learning task with game adventure [21]. The sequence of problem solving that will form the basis of the algorithm is as shown in Figure 4 below. the first design begins with getting character playing data, containing the basic attributes that determine the character's abilities. The process of completing the game depends on the character's ability to pass the level. Related to character development there is a quest about basic mathematical knowledge and the questions.

In this study, Role Playing Games was used as a basis for the scheme and storyline of the game. The story had been organized to be followed stages by stages in each level. Players were able to develop characters in the story. For analysis the response about game play on this study we used descriptive qualitative method. Qualitative research is research that can result findings that cannot be achieved using statistical procedures or quantitative methods. Qualitative research can show community lives,

history, behavior, organizational functionalism, social movements, and kinship relationships. Some data can be measured through census data, but the analysis is still qualitative data analysis [17]. In this case, researcher measured the assumption of using digital games in learning defend the country matherials.

2.2. Data, Instruments, and Data Collection Techniques

We proposed an assessment based on the assumption of the game with 2 models, namely a pretest which was carried out to determine the initial conditions of the players before learning, then conducted a middle test in which learning had been carried out through traditional learning. Finally, a post-test was conducted to determine game-based learning as well as to determine the final result of the assumption in game-based learning. The assessment was based on numbers with a scoring method related to the learning process to determine the assessment projection using a Likert scale [18] as shown at table 2 below.

Table 2. Score Criteria.

Score	Criteria	Percentage
5	Strongly agree	80% - 100%
4	Agree	60% - 79.99%
3	Just Agree	40% - 59.99%
2	Disagree	20% - 39.99%
1	Strongly Disagree	0% - 19.99%

Next, there was an assessment towards the performance of learning games using learning game media with additional assessments related to the features and appearance of the game to determine the assessment that was displayed. The withdrawal and verification stage of the conclusion from the researcher interpreted the data as a whole to draw conclusions about the game's performance whether it was effective or not in its implementation can be seen at next table 3.

Table 3. Game Based Learning Performing Score.

Scoring	Criteria
90 - 100	Very well
70 - 89	Well
50 - 69	Enough
30 - 49	Not enough
0 – 29	Less once

The assessment used in this study is for learning defend the country materials focusing on the achievement of the learning process by comparing the oration learning with game-based learning. The sampling theme focused on the learning related to the students understanding about the learning materials and the performance of the learning games, whether it has a good value in building formalities or not.

2.3. Data Analysis Technique

Quantitative research is a priority analysis that focuses on numbers, starting from data collection, interpretation of the data obtained and presentation of the results [19]. In this study, the author used quantitative techniques to analyze the data through the conclusions obtained from the test results. The researcher interpreted the data as a whole to draw conclusions by showing the results of the pre-test, middle test and post-test. Then, the data was displayed from the projected percentage of each calculated indicator. From the results of the data displayed, it can be seen that the projected effectiveness of the learning methods [20].

3. RESULT AND DISCUSSION
3.1. Game Description

This "Anak Negeri" game was made for students to play as the main players in each game by playing the main character to take on a learning assignment. Learning to Defend the Country in the game "Anak Negeri" was performed by giving learning quests to the main character to achieve the learning objectives as previously set based on the CPMP (Subject Learning Outcomes) that had been designed by the teacher as Education instructor in the RPS (Semester Learning Plan). The game "Anak Negeri" which was RPG-based game could be said to be quite similar to the "differential game" as game theory, which modeled learning scenarios which would continue to develop following the achievements of the learning tasks that had been undertaken by the main character [22]. Learning quests would continue to develop as the completion of assignments by students increases, of course with learning scenarios that were arranged systematically as shown in Figure 3-6.

3.2. User Interface

Verify the user interface in the game is a crucial factor, because it determines the player's interest in playing video games, especially the role-playing game mechanism which has a scope of game schemes and storylines. The plot itself in game "Anak Negeri" starts from the character being in the house of the character in a village, with lots of NPCs that support the storyline. Players can develop characters in the story. The main purpose

of making the game is to mix learning tasks with game quests. Through the script, players are guided to find out how to help NPCs by completing tasks given by the game, which is the core of the game in the form of the 4 tasks about defend the country. The design of defend the country learning task is explained as following which contains material about defend the country. The location of the character is at the beginning of the game which the player (student) must learn. It can be seen from the following figure 3-6.

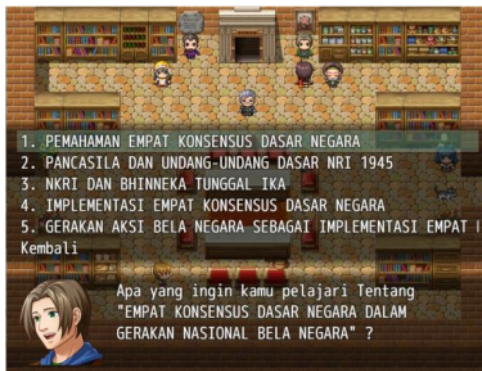*Figure 3. Task 1 Learning About the History of the Struggle of the Indonesian Nation*

Figure 4. Task 2 Learning About the Four Basic Consensus of the State in the National Movement for Defending the Country
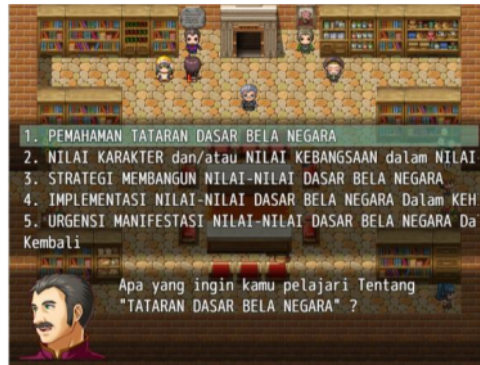

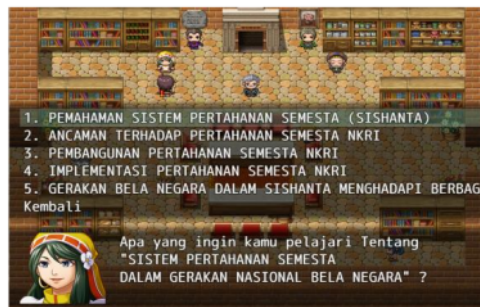*Figure 5. Task 3 Learning About the Basic Level of State Defense*

Figure 6. Task 4 Learning About Sishanta in the National Defense Movement

3.3. Analysis of Questionnaire Results and Questions About the Game

This study obtained data from 40 student players in each classroom (total 120 students). The analysis results showed that the pretest or before the implementation of learning on 5 questions in each 4 tasks, the average value of students understanding was 3.848 ± 0.078 or sufficient. While, in the middle test, the average student understanding showed a value of 4.37 ± 0.131 or very good. The post test results showed that the average student understanding was 4.665 ± 0.102 or very good. As seen on figure 7 below.
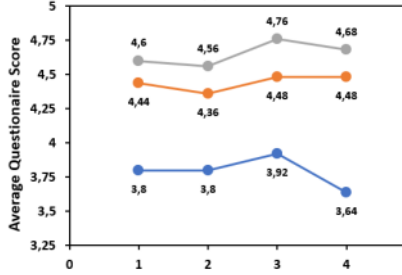

(a)
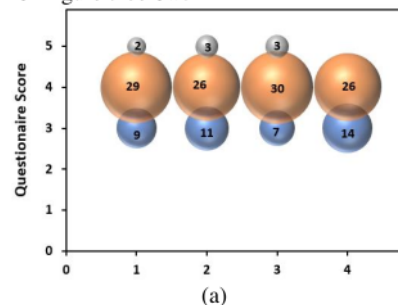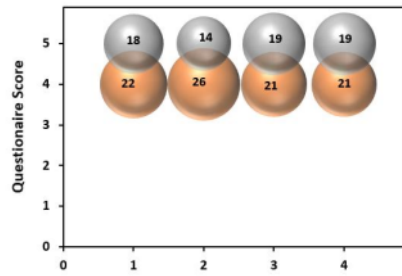
(b)
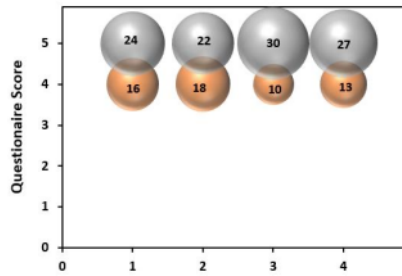
(c)

(d)

Figure 7. Scoring distribution of (a) Pre-Test, (b) Mid-Test, and (c) Post-Test, and also obtained (d) the average score.

Compared with the pretest results using Likert scale. The following calculation used a Likert scale with 4 Learning Tasks on the pretest to determine the initial conditions of players' understanding towards learning material determined on table 4 below.

Table 4. Calculations of Pre-, Mid-, and Post-Test using Likert Scale.

Answer	Weight Score (x)	Learning Tasks				F(x)	%Likert Scale =Total Score/300x100
		1	2	3	4		
Pre-Test							
Strongly agree	5	2	3	3	0	40	=[(607/5)/(40x4)] x 100% = [121.4/160] x 100% = 75.88%
Agree	4	29	26	30	26	444	
Agree	3	9	11	7	14	123	
Disagree	2	0	0	0	0	0	
Strongly Disagree	1	0	0	0	0	0	
Total		40	40	40	40	607	75.88
Mid-Test							
Strongly	5	18	14	19	19	350	=[(710/5)/(40x4)] x

							100% = [142/160] x 100% = 88.75%
agree							
Agree	4	22	26	21	21	360	
Agree	3	0	0	0	0	0	
Disagree	2	0	0	0	0	0	
Strongly Disagree	1	0	0	0	0	0	
Total		40	40	40	40	710	88.75
Post-Test							
Strongly agree	5	24	22	30	27	515	=[(743/5)/(40x4)] x 100% = [148.6/160] x 100% = 92.88%
Agree	4	16	18	10	13	228	
Agree	3	0	0	0	0	0	
Disagree	2	0	0	0	0	0	
Strongly Disagree	1	0	0	0	0	0	
Total		40	40	40	40	743	92.88

Based on the pretest calculation results, it showed that the average percentage was 75.88 which means agree. This means that there were a sufficient number of players who agree with the learning tasks. Furthermore, a recapitulation of all test modes and an improvement in the learning process was shown on table 5.

Table 5. Recapitulation of all test modes and an improvement on defend the country modules

No	Mode Test	Score Interval	Improvement (x)
1	Pre-Test (x)	75.88	-
2	Mid-Test (y)	88.75	+12.88
3	Post-Test (z)	92.88	+4.13

From the calculation results of the players' initial conditions, it was obtained a value of 75.88% in the pretest phase, there was an increase in the value of 12.88% to 88.75% in the middle test which were using traditional learning methods, then it increased by 4.13% to 92.88% when continued by game learning methods. If the learning methods compared, the results showed that using combination learning method with oral and game methods gave significant increasing by 17% which from the pre-test 75.88% to be the post-test 92.88%. Next would-be projection assessment of game performance using video game media to see the suitability between the learning process and the making of video game formalities as shown on the next figure 8 below.
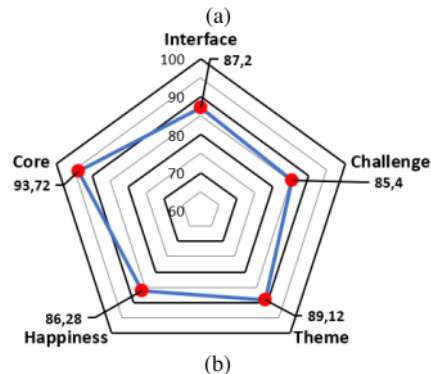
(a)

(b)
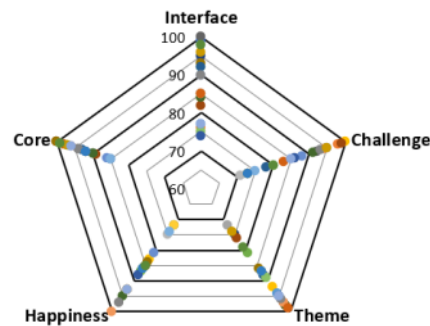
Figure 8. Graphic average scoring projection, (a) score distribution obtained from post-test respondence, and (b) their average score.

Data from the assessment results about the performance of digital games with 5 main indicators to assess the formality of the game obtained a total average value of 87% with the following details,

1. *Appearance of the game.* Based on the online learning questionnaire analysis of each indicator in defend the country materials, it shows that the average score was 87.2%, which means it was very effective.
2. *Game Challenges.* The players gave an assessment for the challenges that occurred in this game, 85.4% of the students felt that the challenges in this game were very effective in helping students understood the defend the country materials.
3. *Theme Relationships* (Script, Sound and Image). Based on analysis results from the players, it shows that the themes in the game (scripts, sounds and pictures) had an effect of 89.12% on students' materials understanding of defend the country.
4. *Fun in Gameplay.* The players gave an assessment towards the fun in playing this game, and the results show that 86.28% of the students felt happy in playing this game.
5. *Essential core of the game.* The players gave an assessment towards the essential core of this game, and the results show that 93.72% of students felt that the essential core of this game helped students' materials understanding of defend the country.

3.4. Discussion

Game-based learning is currently one of the main choices in developing learning methods for defense, for example for learning the history of nation's wars, military defense, safety and security, and cyber defense and security. The games majorly made for defense learning were based on adventure simulations where the main character could move freely according to the will, purpose, and desire of the game player [23-26]. This type of the game does have good game system and appearance which teaches players to deal with real situations in war. However, it should be noted that the simulation adventure game model is considered only suitable for students from teenagers to adults. Of course, these games are less or irrelevant when played by elementary school students, because they risk teaching inappropriate attitudes, such as violence, competition between players which could potentially become unfair competition, till students become less focused on the state defense learning scenarios that were made. In addition to, the cultivation of state defense material will be less focused because students will be more concerned with the appearance of the characters and their actions in the simulation adventure game. Therefore, for elementary school students, the game "National Children" was created which basically educates in the cognitive aspect and instills spirit of patriotism in defending the country, as well as educating good moral ethics for learning students' affective behavior from an early age. In addition, all scenario designs for state defense learning materials in RPS from learning instructors will be difficult to include in the game considering that building and developing simulation adventure game model is fairly complex subsequently it will be quite burdensome for game developers to modify the game according to the learning instructor's request.

The RPG-based "Anak Negeri" game with similarities to the "differential game" game theory was made in 2D features that were similar to the appearance of adventure games on GBA and Android generally, with the selection of this RPG game model to minimize real action features to restrict students' knowledge regarding real action (such as violence) to support cognitive aspects of learning. Therefore, through this game students could focus more on learning through completing learning quests with learning scenarios that had been designed by learning instructors in RPS. From the implementation of this game that had been built, students experienced increasing in cognitive learning outcomes when compared to before the learning took place and with the classical learning method (represented in table 4-5 and figure 7). It was reinforced by student assessments regarding the core game of "Anak Negeri" in which 93.72% of students were able to understand the essential core of learning to defend the country through

giving systematic learning assignments from the learning scenarios for defending the country that had been designed in the game. In addition, students' assessment of the appearance and presentation of the game features represented in Figure 8 shows that students enjoy learning to defend the country through this "Anak Negeri" game where students become more challenged, learning becomes more fun, and with the appearance and theme of the game is felt to support independent learning to defend the country.

4. CONCLUSION

RPG game-based learning from the game "Anak Negeri" has potential to be implemented in learning to defend the country for elementary school students or learning the character of defending the country from an early age. This game was built taking into account the essence of state defense learning based on cognitive and affective learning aspects referring to the lesson plans that had been designed by the learning instructors. This RPG-based game minimizes the appearance of the main character's real actions and tends to highlight the essence of the moral values of learning to defend the country, so that student learning outcomes become more improved in terms of cognitive assessment, as well as increasing students' affective values with moral learning and polite attitudes presented in scenarios of game "Anak Negeri" based on this RPG game model.

The implementation of this game has better cognitive impact on students, where they experienced increase of cognitive learning compared to before performed the class learning, as well as with the classical learning model through orations. By learning through this game, students became more interested in learning, students became more mindful of the essential core of learning to defend the country, with appearance and theme that was attractive to students therefore it is suitable for student learning in elementary schools. This RPG game-based learning model which is also in the adventure genre also has the potential to be further developed by game developers by modifying game characters and scenarios to adjust the learning content prepared by learning instructors through RPS for learning to defend the country in the future. In addition, it will facilitate students to study independently because they feel more challenged to complete as many learning quests as possible which in the game will also increase the value of the game's main character, thus maximizing the time available for elementary school students to study and increase character values for being better in the future.

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