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# Analyzing the Factors that Influence Learning Experience through Game Based Learning using Visual Novel Game for Learning Pancasila

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## Abstract

Games are not only used as a means of entertainment but also can be used as a learning tool. Attractive learning tools can increase the interest of young people or millennial generations, especially for learning conceptual or too theoretical. Pancasila as the basis of the Indonesian nation's life view needs to be understood by the Indonesian people, especially the younger generation. But the way of learning about the Pancasila is currently too theoretical and does not attract young people. Therefore, by making the game that is liked and favored by young people today is used to study the Pancasila. Through this research the author wants to analyze the factors that can affect learning experience using game-based learning. Researchers use multiple linear regression methods to analyze these factors. The game prototype developed in this study uses the visual novel genre which has an interesting story. There are 101 respondents as samples. The analysis showed that there are two factors that influence game-based learning, namely the gameplay factor and the story of the game. So, it can be concluded that for developing game based learning we need to pay attention to these two factors and through this visual novel prototype game, it can be concluded that the prototype of this game has an interesting game play and a story that is easy to understand.

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## 1. INTRODUCTION

Many Games nowadays are now applied on teachings and tourism<sup>1,2</sup>. There are those who use games as means for learning math, science, characters and etc. In Indonesia there are many learning media using game like sudoku, puzzle, quiz, visual novel, hack and slash (Dynasty Warriors and Samurai Warriors) and many other games.

In Indonesia, Pancasila is a view of life and ideology of Indonesia, that its existence was almost changed from the hearts of Indonesian people by another ideology<sup>3</sup>. That ideology was Pancasila ideology which is based from Indonesia that have five moral principle as reflection for Indonesian people. In this era of globalization, the Indonesian people need to understand the values of Pancasila<sup>4</sup>. However, understanding the values of Pancasila among young people is not deep enough. One of the problems that Indonesia have is losing the spirit of Nationalism and patriotism on young generations. This problem was caused by foreign culture that entered our country, the results of this make the young generations think that foreign culture is more cooler compared to our own culture<sup>5</sup>.

Based on the background, the problem is less effectiveness of civic education that is received by students on school because they are traditional and less interesting. Besides the education on elementary, middle school, and Highschool, Education of Pancasila also accepted on University. That Problem is going to be solved by using based Visual Novel with a gamification as a plus on the game. The target of the user is middle school students and high school students so that it could teach the young generation how much important is Pancasila.

The purpose of this research is for the players could understand the importance of Pancasila values through this visual novel with more interesting, intellectual, and could deliver the importance of Pancasila to the user efficiently, the game also has points, badges, and various rewards for completing the five chapters to increase the fun on overall story. But, if the player makes the wrong choice, it will cause game over and the player need to start the story from the beginning again. This research also used to know the factors that influence learning experience based on motivation and level of understanding variable.

## 2. LITERATURE REVIEW

### 2.1 Game-Based Learning

Annie and Amanda explained that when designed using learning principles in mind, games can increase student motivation, engagement, and learning. Game-based learning is not just creating games for students to play, but also that designing learning activities can incrementally introduce the concepts and guide the users to the end goal<sup>6</sup>. Juho Hamari Research shows that educational video games can effectively involve students in the learning activity, and can be activated by raising the level of the challenges and creativity while playing the game. There are 11 crucial game-design factors for game-based learning, factors, including game goals, game mechanism, game fantasy, game value, interaction, freedom, narrative, sensation, challenges, sociality, and mystery<sup>7</sup>. Rula al azawi stated that Game-Based Learning is not just about using games for review and reinforcement<sup>8</sup>.

The challenge factor of the game must be considered, because according to the paper it could associated with the teaching objectives, and certain game challenges are generated from teaching objects and learning content, and they will test the player's knowledge and skill<sup>9</sup>. Annie and Amanda stated that Game-Based Learning can be used in a variety of ways to enhance library instruction, and research across the discipline that supports its effectiveness in the classroom<sup>6</sup>.

### 2.2 Gamification

Gamification term is usually use to denote the application of game mechanisms In non-gaming environments with the aim of enhancing the process enacted and the experience of those involved<sup>10</sup>. The definition of gamification is the use of game design elements in non-game contexts<sup>11</sup>. In order to avoid unnecessarily limiting the goals of gamification, this definition expressly omits possible purposes. Instead, it relies on the four semantic components (1) game, (2) elements, (3) design, and (4) non-game contexts<sup>12</sup>. Research by Michael Sailer and team shows that gamification can

be a powerful solution to address motivational problems within learning or working contexts, as long as they are well designed and are built upon well-established implementation model<sup>13</sup>.

There is also 4 areas in gamification, The four areas are Points – something for players to earn, Rewards- something for players to spend their points on, Badges – something to show peers the achievements ‘players’ have unlocked, Leaderboards – a method of gaining some real-time feedback which is visible to everyone<sup>9</sup>. Gamification has benefits that includes<sup>13</sup>

- a) Increased engagement
- b) Higher motivation levels
- c) Increased interaction with the user(customer/employee)
- d) Greater Loyalty

G. Surendele added that key advantages of gamification is the low cost of development and the possibility of making learning content more delicious or interesting using game elements<sup>10</sup>.

### 2.3 Multiple Regression Model

A regression model is use to describe a relationship between independent and dependent variable. It is a commonly used in statistical model. Because there are more than one variable in independent variable, so it called multiple linear regression model<sup>14</sup>. In the general case, there are  $p$  independent variables then the general multiple regression model can be write as follow<sup>15</sup>.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p + \varepsilon \quad (1)$$

In the equation (1), showed that  $\beta_0, \beta_1, \dots, \beta_p$  are the parameters of regression model. Then  $X_1, X_2, \dots, X_p$  are independent variables,  $Y$  is dependent variable and  $\varepsilon$  is error term. One of the assumptions in multiple regression model is the mean of error is zero. Then the  $\beta$  parameters have to estimate to obtain regression model. This is the formula to estimate the parameters.

$$\hat{\beta} = (X^T X)^{-1} X^T Y \quad (2)$$

## 3. METHODOLOGY

For the first step the author search topic of Gamification, and Game-Based Learning. From the topic the author analyzes the data and looks for GAP between the previous research and the proposed method. The author also determines what material will be implemented into the game, and the result is the Honorable Value of Pancasila. Author also chose Visual Novel Game as the main game genre in learning. The next step is the Design stage, in which there is Story Design, Gameplay Design, Gamification Design, and Art Design. The prototype game uses Gamification elements such as collecting badges after completing a story chapter, because it can help users be more motivated in playing our games while learning<sup>[8]</sup>. Making the prototype game using the Visual Novel Maker application. In the prototype game there is a story gameplay where users can learn meaning, and examples of the application of the Honorable Value of Pancasila in daily life. The prototype game uses free assets such as character design, design background, and music. Then followed by making the storyboard so that it can be easily evaluated.

The User evaluation Questionnaire will be run or distributed after the game prototype has been successfully created, from the questionnaire we can find out other people's opinions about our game<sup>16</sup>. The purpose of the distribution of questionnaires is to analyze whether the Friendship game prototype meets the target or not. To analyze the User evaluation Questionnaire data, the author uses the Regression Analysis method. Regression Analysis is a conceptually simple method for investigating functional relationships among variables. By using this method we can find out what factors influences the design of Visual Novel Game Based learning in order to attract the attention of users.

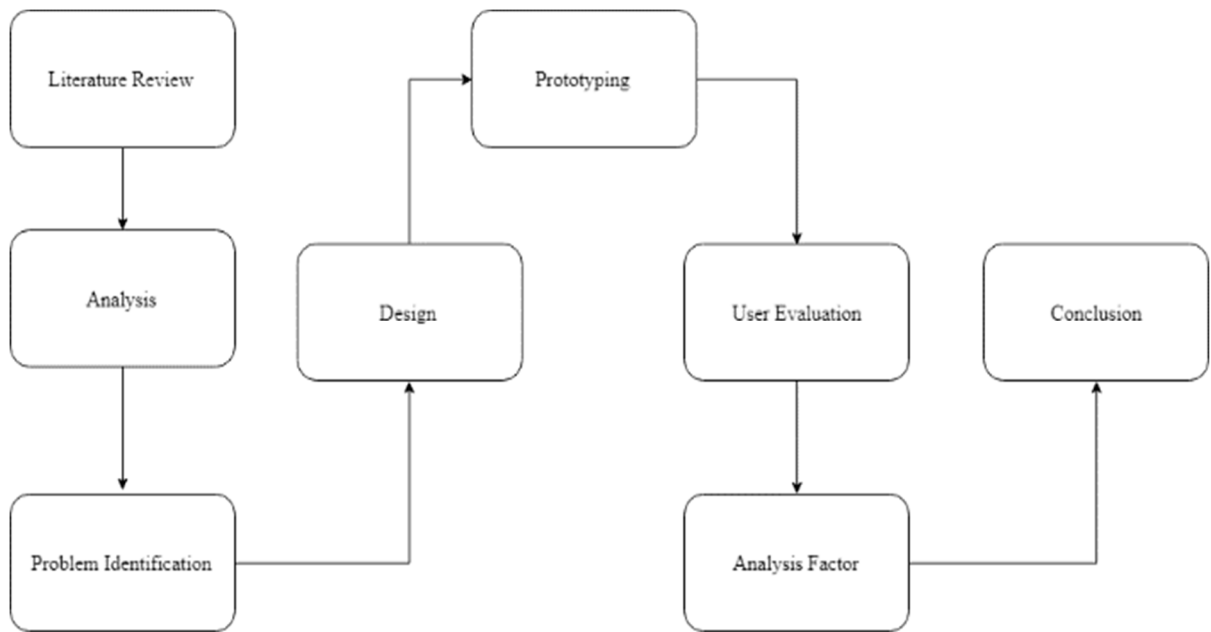


Fig. 1. Methodology Diagram

#### 4. RESULT AND DISCUSSION

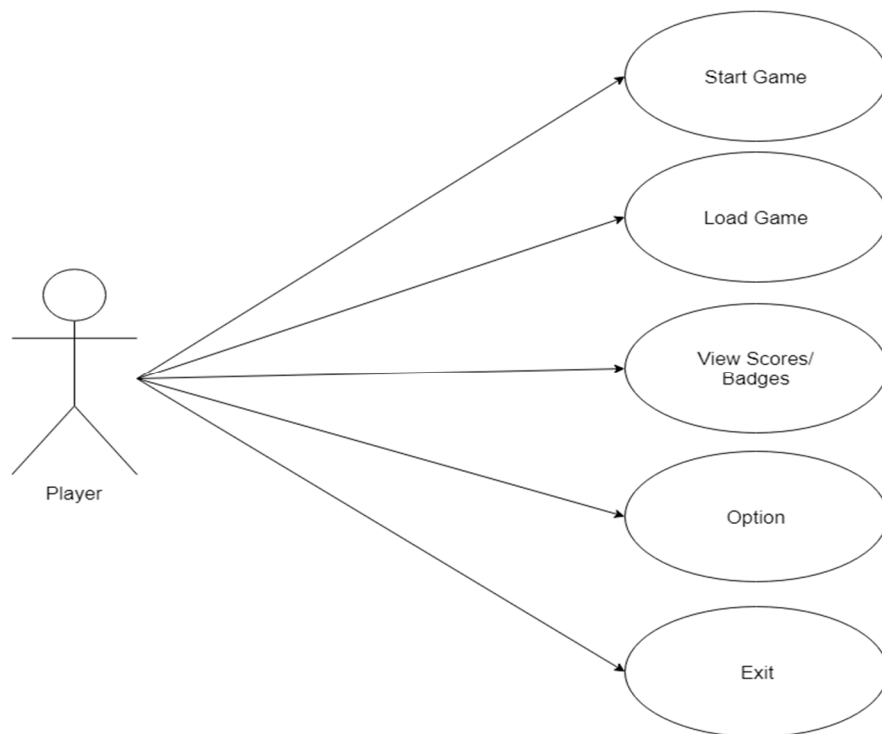


Fig. 2. Use Case

On the Use Case Diagram, it shows that the player could do the 5 option as showed above, player can Start the game, Load the game save files, view the score/badges, opening the option tools, and exiting the game

After reviewing previous studies, the authors have proposed to design and create Visual Novel Game. This game education will created on smartphone because it's easy to take and use. For the Game that we are making, we use Bahasa Indonesia since our target user are for Indonesian Students. For the Gameplay. It is pretty simple because this is a Visual Novel Genre, where you just click the dialogue and choose the choices for the flow of the story. The theme for the story is school life and friendship. For the picture of the gameplay as we can see it in (Fig. 3). The description of the image are that the girl character is scolding the white haired boy character, the girl said: "Be polite Jon. You don't use that kind of words to the teacher" (Fig. 3). As a means of interaction with users in the gameplay there is also a "Choose" feature for making decisions (See Fig. 4). The description on the (Fig. 4) explained that the white haired boy character asked what to do on the yellow haired boy character, The white haired boy character said: "What do you think Bayu ?" and then the option popped out and the player must choose one of them, the 3 options are: "Climb the wall behind the school", "Enter through the front door", "Skip the school and go to Mr. Asep's Tavern" . Gamification as a method to make users more interested and motivated in completing a story chapter (See Fig. 5, Fig. 6). Each player completes one chapter so as a reward the player gets 200points and badges. Badges are collected up to five to complete the shield on the Garuda bird's chest.

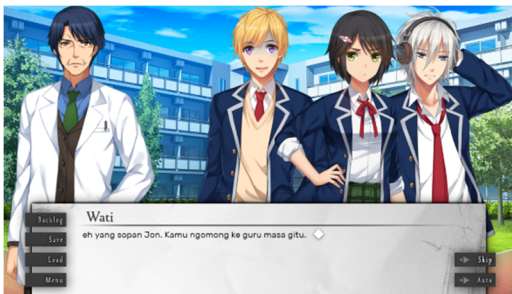


Fig. 3. Gameplay

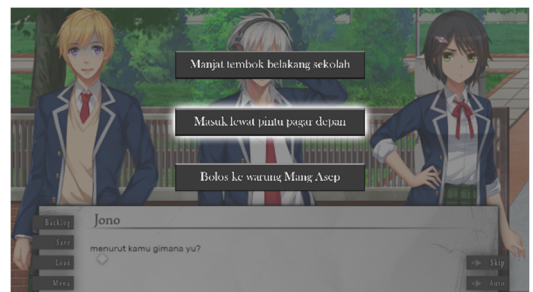


Fig. 4. Chose Fiture

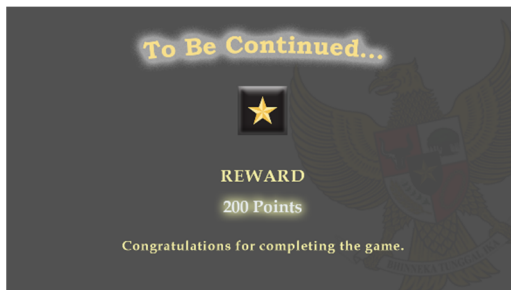


Fig. 5. Gamification Reward (Badges and Points)



Fig. 6. Gamification Complete all Chapter Badges

For the data analysis, the User Experience Questionnaire author uses the Regression Analysis method. From a number of questions we focused on the question "Does playing the Friendship game motivate you to apply Pancasila values in everyday life?" And "Can playing the Friendship game help you understand the meaning of the principles of Pancasila?". This regression analysis method is used to determine the factors that influence the motivation of the application of Pancasila values. The following are the results of regression modelling using the variable playing the Friendship game and the variable recommending the Friendship game.

Table 1. Regression Table for Motivate.

Variable	Coefficients	Standard Error	t Stat	P-value
Intercept	0.13115	0.36929	0.35513	0.72326
Q	0.71889	0.08534	8.42425	$3.12933 \times 10^{-13}$
T	0.23878	0.08199	2.91215	0.00444

Based on Table 1 the main question is "Does playing the Friendship game motivate you to apply Pancasila values in everyday life?". While as influential factor, namely, Q is a question "Does playing the Friendship game help you understand the meaning of the principles of Pancasila?". While T is the question "Will you recommend the Friendship game to your friends?". Coefficient of Q variable showed that if the understanding of player is increase then the motivation of player will increase 0.71889 point. If recommendation of player increase then motivation of player will increase 0.2387 point. Based on the P-value from Table 1 the variables Q and T indicate that the value of  $p < 0.1$  and the standard error of this variables are closed to zero. The hypothesis test for independent variables showed that statistics test of t stat is greater than 1.29. It means that the variable playing the Friendship game and the variable recommending the Friendship game influences the application of Pancasila values. But for the intercept, t stat value is less than 1.29. It means the intercept is not significant in the regression model. Furthermore, doing regression modelling for the variable playing the Friendship game can help understand the meaning of the principles of Pancasila. In this study, we want to know the factors that influenced these variables. Based on the results of the regression analysis, we obtained two influential factors, namely interesting gameplay variables and variable stories that are easy to understand. The following are the results of the regression model analysis.

Table 2. Regression Table for Level of Understanding

Variable	Coefficients	Standard Error	t Stat	P-value
Intercept	1.44237	0.47555	3.03307	0.003098
N	0.20659	0.08520	2.42465	0.017155
M	0.46485	0.09491	4.89769	$3.82634 \times 10^{-6}$

The main question is "Does playing the Friendship game help you understand the meaning of the principles of Pancasila?". While as a determining factor, namely, N is the question "Is the gameplay of the Friendship game interesting?". While M is the question "Is the story in The Friendship game easy to understand?". Both of these variables have a significant effect on the variable by playing the Friendship game can help understand the meaning of the principles of Pancasila. This can be seen from the p value in Table 2, where the p value is greater than 0.1. So that The Friendship game will be able to help users understand the meaning of the principles of Pancasila because The Friendship game has a story that is easy to understand and the game is interesting.

## 5. CONCLUSION

There are two factors that influenced learning experience through Game Based Learning, which is interesting Gameplay with an easy-to-understand Story. Based on the survey results the respondents showed that the friendship game prototype has an interesting game play and easy to understand story so that it attracts users to learn the precepts in the Pancasila through Visual Novel games. Based on regression analysis, the motivation to apply Pancasila values in everyday life can be influenced by understanding and recommendation of the game. Furthermore, the understanding of the principles of Pancasila can be influenced by the story in The Friendship game is easy to understand and The Friendship game is interesting. The development of further research, researchers want to explore the independent variables and analyze Visual Novel Games to be applied in online learning.

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