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Augmented Reality Game for Anti Corruption Education in Behavior of Students of University

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Abstract – The behavior of students of university in their study have an effect in their character toward corruption. As motivation effects the behavior and the behavior effects the character of person [1]. Game is one of interactive digital media that can be used as educational tools. Game education is a digital game which structured for educational purpose [2]. Augmented Reality game is a live direct or indirect view from real word perspective whose elements are augmented by computer-generated in which a view of reality is modified even diminished by a computer [3]. This Journal contains the result of using Augmented Reality game as education media for anti corruption education in behavior of university students. Education materials consist of bad behavior of university students that appear on their study and their relation with corruption.

Keywords – Augmented Reality, Game, Behavior, University, Student, Education

I. INTRODUCTION

In current development, games are more commonly associated with game-shaped software that can be played in various electronic media. According to survey in 2014, industry of game in Indonesia was said to have a value of 2.3 trillion rupiah [4]. This shows an opportunity for game developers, however this also shows the numbers of gamer in Indonesia. In 2006, a study conducted on 6700 players of MMORTS and it concluded that game can affects a person's motivation [5]. Motivation itself is the construction of theory, that is used to explain the attitudes or behavior of person. Motivation provides reasons for human actions, the wills and needs. Motivation can also be defined as the direction of humans in behaving or the reason why humans repeat certain behavior [6]. Leaving aside the positive and negative effects of the game, the use of games in influencing one's motivation has been markedly evident, and it is clear that the problem of corruption in Indonesia has been a prolonged problem [7]. Based on data of 2016, level of corruption cases that has founded, can see in Figure 1 [8].
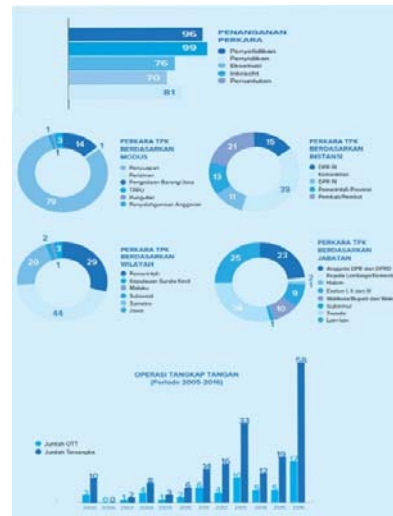

Figure 1. Yearly Report of Numbers OTT KPK Year of 2016

The message against corruption must not be shown only for the corruptor but also to the behavior which creates character of

corruptor. Anti-corruption education in the behavior of university students is something important to be noted. University Students as prospective employees, smart thinker, and the expectations of society must have character that has integrity and virtuous [1]. Based on a pre-test survey that serves to identifies problems that will be discussed in the game, the result was [9][10][11]. Can be look in table 1.

Table 1. Data of University Student Problems

No	Problems	ID Problems
1	Passive at group work	11
2	Helping people to cheat	9
3	Postpone assigments act	6
4	Lack of motivation	13
5	Signing absent students into class	8
6	Lie to teacher	10
7	Late	3
8	Not collecting assignment(s)	5
9	Copy-paste of assigment(s)	4
10	Study Priority	14
11	Cheating at test	2
12	Plagiarism	7
13	Study Priority	12
14	Ditching act	1

Three issues with bigest correlation value are selected as the issues to discussed in game. The three issues are passive at group work, helping people to cheat, and postpone assigment(s) act.

II. LITERATURE REVIEW

A. Game

Game is an interactive activity that is centered on an achievement, there are active and opposing actors [12]. In it's development, the game's genre started to be classified into several genres according to the Gameplay it's used

Game creator needs to figure out how their creation can be accepted by public. Game creator also needs to think about a good educational message for his game players. Therefore, a game needs to be created with specific goals that have been determined. It involves the genre which is in accordance with Gameplay.

B. Augmented Reality

Augmented Reality game is a live direct or indirect view from real word perspective whose elements are augmented by computer-generated in which a view of reality is modified even diminished by a computer [3]. Augmented reality becomes one of the popular game's genre in the world. As the times progressed, the progress of the Augmented Reality system becomes more interactive and tangible. The existence of smart phone also increase application of Augmented Reality system in the community. Over time, Augmented Reality market has grown rapidly. This is related to the development of hardware. Based on Zion Research Center's, Augmented Reality market will increased as technology develops every year [13].

C. Unity Engine

Unity is one of very popular game-making tool (game engine) in the world. Unity is a cross-platform game engine developed by Unity Technologies and can be used for PC game development, consoles, mobile devices, and websites. Unity has 3 programming languages that can be used i.e. C #, UnityScript, and Java.

Unity works with many other developer companies to bring up many packages files that can be downloaded via the internet. As for Augmented Reality game development, developers can use Vuforia (one of many Unity package file). This unity package file

helps developers in game development and creation.

D. Vuforia

Vuforia is one of many Augmented Reality Software Development Kit (SDK) for mobile devices that is useful for Augmented Reality application creation and development. Vuforia uses Computer Vision to recognize and track planar images and simple 3D objects, such as boxes in real-time.

The ability to tracks these images, allows developers to position virtual objects in the real world when viewed through a camera from a mobile device. Virtual objects then track the position and orientation of the image in real-time so that the perspective on the object in accordance with the perspective of the observer (user), so it will appears that the virtual object is part of the real world scene.

E. Anti-Corruption Education in University Student Behavior

Generation with tasteless character breeds behavior of corruptor [10]. University students as the next generation of the nation becomes something important to note [1]. The long-terms goal is to nurturing a culture of anti-corruption among university students and to encourages university students to take an active role in eradicating act of corruption in Indonesia [12]. Anti-corruption education in universities plays an important role for buliding student's characters [1].

F. Relation Of Game And Education of Character Building

Educational game is digital games designed for educational enrichment, using interative multimedia technology [2]. Augmented Reality genre game provides education with the delivery of messages against bad habits among university students. Players learn to get motivation to not doing bad habits in the lectures where the motivation will be related to the behavior of players [6].

Character is the way of thinking and behaving that characterizes each individual. Character is also the moral quality of a person thats reflected all the behavior of a person [6]. Character and behavior are stratified one another where the behavior affects character and character can be seen through the person's behavior.

III. METHODS
A. Data Search Sources and Method

Primary data sources obtained from the survey conducted in the field, while the secondary data sources obtained from theory of scientific journals, books and newspapers, as well as government-owned official website and software developers.

Data search method that is used in this research is quantitative method. This method was shown by survey implementation. Survey was conducted with random sampling type. The subjects of research were selected with several provisions:

1. The research subject is university student.
2. The subject is an active university student.
3. Research subjects are not given any special treatment between one and the other, identical and randomly selected.

Pre-test survey was used to assessing the number of corrupt behaviors that are developing among students. Pre-test survey will also answer the needs of messages to be delivered via Augmented Reality game.

The effectiveness of the Augmented Reality game in conveying messages against bad habits will be examined by the post-test survey, that is, with a questionnaire dispatch containing opinions from 30 students who have tried to play the game.

B. Game Development Method

Game development method started by doing research and preparing game concepts. After doing basic drafting of the game, do the preparation of Assets (images, 3D objects)

and to arranges Level Designs. This acts is usually called as Development Stage.

At the Development stage, game test is conducted to test the performance and stability of the game and to gather the players' opinions for further improvement. The game that has been successfully created will be tested to 30 students, where students are asked to complete the post-test survey. Post-test surveys are useful for collecting data on the effectiveness of educational messages so as to meet research objectives.

C. Data Analysis Methods

Pre-test survey which is the phase of problem identification will be tested using correlation of Pearson Product moment. The correlation of Pearson was chosen for the following reasons:

1. Sample data is taken with random sampling type.
2. Sample data has more than 30 people.
3. Data is homogeneous.
4. Calculate the validity of data from each issue.

Calculations for survey have values :

1. Choice 1 : 0 point
2. Choice 2 : 1 point
3. Choice 3 : 2 point
4. Choice 4 : 3 point
5. Choice 5 : 4 point

The Pearson's correlation formula is as follows:

$$r_{ix} = \frac{n\Sigma ix - (\Sigma i)(\Sigma x)}{\sqrt{(n\Sigma i^2 - (\Sigma t)^2)(n\Sigma x^2 - (\Sigma x)^2)}} \qquad (1)$$

Information :

r_{ix} = Correlation coefficient item – total

i = Item score

x = Total score

n = Number of subject

Each values of item corellation will be compared with df (degree of freedom) 5%. When the correlation values is greater than the value of table df then the data will be declared valid

The results of the pre-test survey will selected 3 problems with the greatest correlation value. This three problems will be discussed in the game.

Finished Game will be tested to 30 university students by survey method as post-test survey. The 30 universty students are university students who fill the pre-test survey before. This post-test survey tested the effectiveness of games in conveying messages against bad habits of students in anti corruption education. Post-test surveys will be processed using Pearson's correlation. The results of the post-test survey will show the results of effectiveness of game in the delivery message.

IV. POST-TEST SURVEY RESULTS

The calculation is performed by One-Sample T Test to prove the proposed hypothesis and Pearson correlation to prove that independent variables Q2, Q3, and Q4 are correlated with the dependent variable Q1. The hypothesis is as follow:

H1: Game conveys the message of relationships between corruption and character of college student.

H2: Game does convey a message against postponement of assigment act as it related to anti-corruption education.

H3: Game conveys a message against cheat in test act as it related to anti-corruption education.

H4: Game conveys a message against the act of passiveness in group work as it related to anti-corruption education.

The following questions are built to answer the hypothesis:

Q1) After player(s) plays the game, how much do you rate for messages of correlation between corruption and character of college student?

Q2) After player(s) plays the game, how much do you rate for message against postponement of assigment act as it related to anti-corruption education?

Q3) After player(s) plays the game, how much do you rate for message against cheat in test act as it related to anti-corruption education?

Q4) After player(s) plays the game, how much do you rate for message against the act of passiveness in group work as it related to anti-corruption education?

The result of Post-Test Survey can be seen on Table 1.

Table 1. Result of Post-Test Survey

ID	Answer per person			
	Choice1	Choice2	Choice3	Choice4
1	0	1	7	15
2	0	2	4	13
3	0	0	8	10
4	0	0	4	13
5	0	0	3	15

The result of post-test survey was processed by SPSS. The result can be seen on table 2 and table 3.

Table 2. One- Sample Statistics

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Q1	30	3,9333	,78492	,14331
Q2	30	4,1000	,88474	,16153
Q3	30	4,1333	,81931	,14958
Q4	30	4,3000	,70221	,12821

Table 3. One- Sample Test

One-Sample Test

	Test Value = 3			
	t	df	Sig. (2-tailed)	Mean Difference
Q1	6,513	29	,000	,93333
Q2	6,810	29	,000	1,10000
Q3	7,577	29	,000	1,13333
Q4	10,140	29	,000	1,30000

Mean of variable Q1, Q2, Q3 is more than 3 and the difference of neutral value of 3 is a positive. It means the hypothesis of H1, H2, H3, and H4 is supported.

To show correlation of variables Q2, Q3, Q4 and variable Q1, SPSS program was used to calculates the result can be seen on table 4.

Table 4. Correlation Results Using SPSS

Correlations

		q1	q2	q3	q4
q2	Pearson Correlation	,606**	1	,457*	,616**
	Sig. (2-tailed)	,000		,011	,000
	N	30	30	30	30
q3	Pearson Correlation	,658**	,457*	1	,467**
	Sig. (2-tailed)	,000	,011		,009
	N	30	30	30	30
q4	Pearson Correlation	,538**	,616**	,467**	1
	Sig. (2-tailed)	,002	,000	,009	
	N	30	30	30	30
q1	Pearson Correlation	1	,606**	,658**	,538**
	Sig. (2-tailed)		,000	,000	,002
	N	30	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 4. shows variable Q1 have a strong relation with variables Q2, Q3, Q4. This means Variable H1 have a strong relation with H2, H3, H4.

V. CONCLUSION

Game that which created can builds an anti-corruption education. The game is an educational game with the Augmented Reality genre that have visual novel elements which provide the messages related with anti-corruption education.

Based on the research that was conducted, the proposed hypothesis has been proven (supported) based on the One-Sample T Test that has been done.

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• Game does convey a message against postponement of assigment act as it related to anti-corruption education. (H2 → supported)

• Game conveys a message against cheat in test act as it related to anti-corruption education. (H3 → supported)

• Game conveys a message against the act of passiveness in group work as it related to anti-corruption education. (H4 → supported)

• Game conveys the message of relationships between corruption and character of college student. (H1 → supported)

H1 is the main hypothesis that concludes all of anti-corruption messages and has a strong correlation with other hypotheses H2, H3, and H4. The research concludes the game has successed to convey the messages againts corruption, especially university student.

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