

Development of Educational Games Based *Virtual Reality* Use *Millelab* To learn *Computational Thinking* (Case Study at SMK Negeri 6 Kupang)

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Abstract

Development of virtual reality-based educational games in Informatics subjects, Statement and Proposition Logic material using Millealab. This type of research is R&D with quantitative data analysis techniques, using the GDLC (Game Development Life Cycle) method. The purpose of this research is to determine the process of developing virtual reality-based educational games, to find out whether there is an increase in student interest in virtual reality-based educational games and using virtual box media in Statements and Logic material.

Keywords: *Virtual Reality, Millealab, Computational Thinking, and Student Interest*

INTRODUCTION

The development of information and communication technology increasingly influences human life. As it develops, people are starting to become aware of the internet, *cellphone*, television, and various education. *Computational Thinking* (CT) is the main content in applying digital literacy which allows someone to have the ability to solve systematic and complex problems like a computer. The demands of today's teachers are increasingly growing, where teachers must have strong skills, especially in using technology as an effective teaching tool, as well as optimizing the use of digital resources. Based on the results of observations during the field experience program, at SMK Negeri 6 Kupang during class *smartphones* by students, it was found that several students were playing games during the lesson.

The use of technology as a learning medium has been proven to help the learning process be more effective. However, in fact, there are still obstacles in mastering technology among teachers. Apart from that, teachers face challenges in the form of students' behavior who tend to prefer reading through reading. *smartphone* compared to using a book. And the negative thing is that students immediately take learning sources whose truth sometimes cannot be ascertained. Based on the results of observations during the field experience program, at SMK Negeri 6 Kupang during class X learning activities, the problem that researchers encountered was that students were allowed to use *smartphone* in

learning, but teachers cannot fully supervise students' *smartphone* usage activities, and it was found that some students were playing games during the subject. Another problem is that the media used by teachers focuses on textbooks and power points so that students' interest in learning about the Informatics learning process is lacking. interesting, where students are asked to take notes and many of them do not take notes, which results in low STS (Mid-Semester Summative) scores or not reaching the KKM (Minimum Completeness Criteria). Therefore, it is necessary to develop digital learning media in the form of games. Based on the problems that have been described, game-based learning media can increase students' interest in learning. Interest in learning itself is a driving factor for students in the learning process where this is based on the student's interest or pleasure and desire to learn. Interest in learning is also an aspect of motivation formation, a phenomenon that is formed as a result of social interaction and student involvement in learning activities. Therefore, researchers developed game-based learning media to train students' computational thinking so that students will have the ability to think computational *thinking* the good one. Apart from that, games are also the right tool nowadays to train CT skills because they are deep *game* educational elements can be provided to train thinking processes and how to solve a problem in stages so that it can improve intellectual development, CT abilities and creativity. Based on the description above,

it is important to create media-based learning *virtual reality* which can facilitate the learning process of students with the concept of learning while playing and it is important to carry out research with the title "Development of Educational Games Based on *Virtual Reality* Use *Millelab* for the Interest of Learning *Computational Thinking*"

METHOD

Based on the discussion of the background and research objectives discussed in the introduction, the method used in this research is the research and development method or *Research and Development* (R&D). This research is located at SMK Negeri 6 Kupang, Jl. Media Gate, RT 8, RW 4, Kelapa Lima Village, Kupang City.

RESULTS AND DISCUSSION

a. Description of Learning Media

The learning media that has been created by researchers is educational game-based learning media *Virtual Reality* use *Millelab* for the Interest of Learning *Computational Thinking*. This learning media is intended for Class X PPLG¹ Kupang State Vocational School 6, with discussions on informatics lessons, material on Statements and Propositional Logic. The research carried out is a type of *Research And Development* (R&D) with research and development procedures using the GDLC method (*Game Development Life Cycle*) whose system sequentially has 6 stages, namely Initialization (the initial process in the form of creating the basic concept of *game*), pre-production (is one of the phases that involves the creation and revision of the design *game* and manufacturing *prototype* games), production (core rotating processes around asset creation, creation *scene game*, and integration of both elements), Testing *Alpha* (to test the usability of the game and run it on the target *platform*), Beta Testing (to carry out third party or external testing which is divided into 2,

namely closed beta testing and open beta testing).

b. Product Display

The display of educational game-based learning media *Virtual Reality* use *Millelab* to learn *Computational Thinking*, class X PPLG¹ State Vocational School 6 Kupang are as follows:

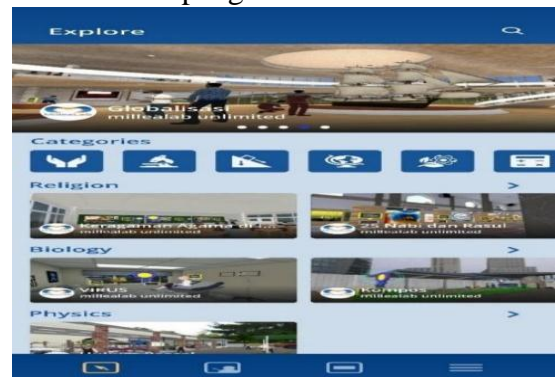


Figure 4.1 Initial page display *Millelab Viewer* And

In the menu display *classroom*, the user asked to enter a code *classroom* which has been made by the manufacturer of the game.



Figure 4.2 Menu page display *Classroom* Appearance *Classroom*

On page view *classroom* here, user just enter *code classroom* which has been given to join the created class. After that the class display will appear and the user can choose which media to use. Before that you have to download the scene available, you can choose the select *mode* that is *Play In VR*, *Play in Gyro* and *Play in Non-Gyro*.

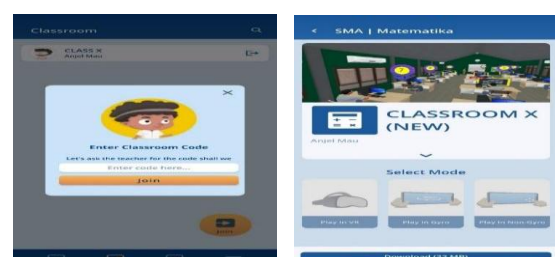


Figure 4.3 Display Classroom

Class Page View

On the class page here are some *standpoints* which one *standpoint* It functions as a media for directions. So, when you want to change position, just follow the direction of the standpoint.



Figure 4.4 Class page display

In-Classroom View

In this classroom display there are game instructions, materials, teachers, students and *quiz* which will be done.



Figure 4.5 View in Class

Game Instructions/Hints Page View

On this page there are instructions/instructions for playing *game* and taking quizzes



Figure 4.6 Instructions page display

Material Page View

On this material page there is an explanation of computational thinking materials (*Computational Thinking*) in video form (Appendix 4). So, *user* just need a direct *standpoint* to play the learning video.



Figure 4.7 Material page display

Appearance Pop Up Quiz

On the page *pop up quiz* Here, there is a display containing 3 questions about computational thinking. After hovering the cursor on *Take Quiz* Later the number of questions and time will appear *cancel* and *start*. To start a working *quiz* then point the cursor at *start*.



Figure 4.8 Display Pop Up Quiz Appearance Quiz

On this page there is a display of the questions *quiz* computational thinking.



Figure 4.8 Display Quiz

Table of First, Second and Third Media Expert
 Validation Calculation Results

No	Media/mat erial expert validation	Total Amount of Results/Numb er of Ideal Values for All Items	Achiev ement Level	Eligibility Qualifications
1	First Media Member	45 / 60 * 100	75 %	OK, no need to revise
2	Second Media Member	52 / 60 * 100	86%	Very good, no need for revision
3	Materials Expert	52 / 60 * 100	86 %	Very good, no need for revision
Amount			247%	

Appearance Review Work Results Quiz

On this page after completing a work quiz, users hover the cursor in the upper right corner to Review Questions where there may be errors when answering can be changed. After that its new user hover over the Submit Quiz to see the score or total points that you get after doing it.



Figure 4.9 Display Review Quiz

c. Media and Material Expert Validation

Before educational products or games were based on virtual reality tested in the field or research location, the first game was tested by two media experts and one material expert. The validation results from the first media member are as follows:

Validation Value calculation formula:

$$p = \frac{\text{Number of Answers}}{\text{Total Ideal Value for All Items}} \times 100$$

P = Percentage what you are looking for

X = Number of answers

Xi = Total ideal value for the entire item

100% = Constant number

Solution:

$$p = \frac{\text{Number of Answers}}{\text{Total Ideal Value for All Items}} \times 100$$

So, the average validation result obtained from the 3 media experts above as a whole is 247% divided by 3 so that the final result is 82.3% with good eligibility qualifications, no need to revise

So, it can be concluded that from the results of the first, second, and one media expert the material is based on educational games Virtual Reality suitable for use as a learning medium in the Informatics subject, Statement and Proposition Logic material, class X PPLG¹ State Vocational School 6.

d. Validation Results for Class X PPLG 1 Students

Educational game-based learning media Virtual Reality use Millelab to learn Computational Thinking This was tested on class X PPLG students¹ SMK Negeri 6 Kupang with a total of 16 students.

Table 4.4. Validation Calculation Results for Class X PPLG Students¹

No.	Name	Total Number of Values	Result/ of Ideal for All	Achievement Level	Eligibility Qualification
1	Adisti Dwi Setya Rini	52 / 60 * 100		86%	Very good, no need to revise
2	Alif Najib Bahri	48/ 60 * 100		80 %	Good, no need to revise
3	Anisa Natalia Lasi	52 / 60 * 100		86%	Very good, no need to revise
4	Bryant Marthin Malelak	56 / 60 * 100		93 %	Very good, no need to revise
5	Defi Angriani Ms	40 / 60 * 100		66 %	Enough, revised
6	Fania Santianti Biaf	56/ 60 * 100		93 %	Very good, no need to revise
7	Fernando Putra B. Adoe	56 / 60 * 100		93 %	Very good, no need to revise
8	Grace Lalangpuling	48 / 60 * 100		80 %	Good, no need to revise
9	Jehan Dominggus Manafe	56 / 60 * 100		93 %	Very good, no need to revise
10	Karolus E. Baunsele	56 / 60 * 100		93 %	Very good, no need to revise
11	Mirna Kardin	56 / 60 * 100		93 %	Very good, no need to revise
12	Maria Putry A. Tafuli	48 / 60 * 100		80 %	Good, no need to revise
13	Railiru Laetario Ali	56 / 60 * 100		93 %	Very good, no need to revise
14	Saleha Ladang	40 / 60 * 100		66 %	Enough, revised
15	Yohanes Rafaeldo Saleh Jena	52 / 60 * 100		86 %	Very good, no need to revise
16	Yosep Muko Bataona	56 / 60 * 100		93%	Very good, no need to revise

Based on the calculation results above, it shows the validation questionnaire for class X PPLG students¹ SMK Negeri 6 Kupang, there are 16 students, the average result of 16 students shows that 1,372 is divided by the number of students, namely 16 students, and gets a final score of 85.75%, the eligibility qualification is very good, no need for revision. So, it can be concluded that according to the results of the questionnaire from class X PPLG students¹ SMK Negeri 6 Kupang is an educational game

based *virtual reality* suitable for use as a learning medium in the Informatics subject, Statement and Proposition Logic material, class X PPLG¹ State Vocational School 6 Kupang.

CONCLUSION

This research uses R&D research with quantitative data analysis techniques, using the GDLC method with six stages, namely Initialization, pre-production, production, testing *alpha*, beta testing and *release*. Researchers discuss 4 important objectives in study This is to find out the development process, feasibility, interesting elements and to find out the influence Study This research uses R&D research with quantitative data analysis techniques, using the GDLC method with six stages, namely Initialization, pre-production, production, testing *alpha*, beta testing and *release*. Researchers discuss 4 important objectives in study. This is to determine the development process, feasibility, interesting elements and to determine the effect of implementing educational game-based learning media *Virtual Reality* use *Millelab* for the Interest of Learning *Computational Thinking*.

SUGGESTION

Further development needs to be carried out to enrich the content and scenarios in VR-based educational games so that they are more diverse and in line with the curriculum of *Computational Thinking*.

Expanding the use of gamification factors in educational games to increase student involvement in the learning process, such as adding a point system, levels and tiered challenges.

Further research is needed with a focus on long-term measurement of the effectiveness of VR-based learning *Millelab*, especially regarding the impact on students' learning outcomes and cognitive abilities.

There needs to be socialization and training for students to use VR effectively, including in terms of safety and comfort when using the device.

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Kualitatif, dan R&D. Bandung: Alfabeta.

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