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'Chick Vs Virus', A Game-Based Learning Approach in Teaching Students

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***Abstract*—Games are increasingly becoming common in learning environments, and to match the requirements of developing a course as a game, a variety of technologies have been developed. Besides education, game-based learning has been popular in other settings, including professional training and social media. By introducing gaming elements as a training method, game-based learning platforms will boost students' engagement, motivation, and productivity. Game-based learning is more than just making games for students to play on the surface; it is also about establishing learning activities that gradually teach subjects and lead users to achieve goals. This study aims to improve students' understanding of the practices that need to be done to deal with various virus attacks today by using the 'CHICK VS VIRUS' Game. This game is designed using the ADDIE Model which contains five phases namely Analysis, Design, Development, Implementation and Evaluation. The programming language used uses the Scratch Application, which is programming using blocks. The research methodology is completely quantitative (quasi-experimental) involving a total of 20 year 1 student consisting of 10 boys and 10 girls. The student were divided into two groups equally, namely the control group that received the implementation of 'CHICK VS VIRUS' and the treatment group that received normal learning. This study involves a pre-test and a post-test. The findings of the study show; (a) the initial knowledge level of all students is at a medium level; (b) there is no significant difference in the mean score of the knowledge level of the control group before and after getting normal learning; (c) there is a significant difference in the mean score of the knowledge level of the treatment group before and after getting the implementation of 'CHICK VS VIRUS'; and (d) there is a significant difference in the mean score of increasing the level of knowledge of the treatment group with the control group. Overall, the implementation of game-based learning 'CHICK VS VIRUS' can increase the level of students' knowledge in preventing the spread of viruses.**

***Keywords*—Game-based learning, Educational Technology, Science and Technology, Health Education, Gamification**

I. INTRODUCTION

In response to the COVID-19 infection epidemic that has invaded the world since the end of 2019, almost all countries around the world have implemented several public health and social measures (PHSM). Although the full opening of schools has been allowed, many parents have chosen not to send their children to attend school due to health reasons and their concerns about SOP compliance among students. This is because it is reported that more than 64,064 school students under the age of 12 have been infected with COVID-19 since May 2021 [1]. Moreover, the problem of concern is the level of acceptance of the school students towards the implementation of the new SOP and its effectiveness after it has been implemented by the school. Through observation, they found that students prefer to approach friends for the purpose of learning and improving their life skills. Thus, this situation at the same time suggests that social distancing should be prioritized among school students even though there are other studies that prove otherwise [2].

Therefore, to educate these students to understand the SOP that has been prepared, the Game Based Learning (GBL) approach is used. GBL creates an enjoyable and targeted educational environment where learners can acquire and build knowledge. GBL involves the incorporation of games or elements, concepts, mechanics, or designs into the educational process [3]. It's a teaching approach that seamlessly integrates educational games into both formal classroom settings and self-directed learning. This approach provides learners with engaging, immersive experiences that enable them to master knowledge and skills effectively. By introducing gaming elements as a training method, game-based learning platforms will boost students'

engagement, motivation, and productivity. Game-based learning is more than just making games for students to play on the surface; it is also about establishing learning activities that gradually teach subjects and lead users to achieve goals[4].

We chose a topic that is appropriate to the current situation, which is related to viral outbreaks such as COVID-19. The game is titled 'Chick vs Virus'. This game targets children from 6 to 15 years old. It aims to make them aware of the dangers of the virus. The relevance of this game to STEM is from a biological and medical point of view. How important is prevention to curb this infectious disease. Players are required to go through several levels that require them to go through certain challenges to get to the next level. Always maintaining the 'Standard Of Procedure' (SOP) and avoiding getting infected is very much emphasized in this game. The main character of the game is the 'Chick'. This character was chosen to give fun to children to try this game. The objectives are to increase knowledge about the SOP of transmission of viruses in schools and to increase students' interest in learning about virus prevention.

II. MATERIALS

A. Story Board

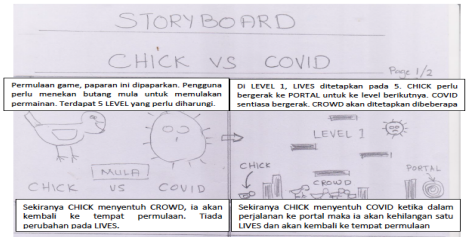

Fig. 1 : Story Board

We have collected related information such as Guidelines (SOP) for the Transmission of COVID-19 in Schools, reading scientific materials, browsing websites such as https://scratch.mit.edu/, http://youtube.com Channel : The Tech Train, and https://mixkit.co/ - to get the appropriate audio.

B. Programming

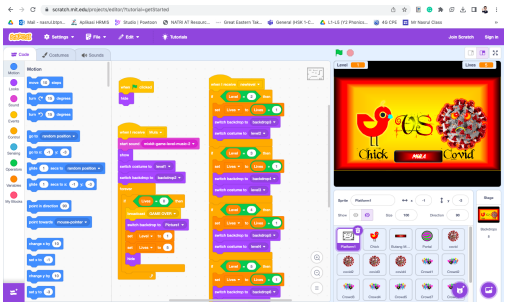

Fig. 2 : Design the game using Scratch

This game is based on the Scratch application which we have studied in the Subject of Reka Bentuk dan Teknologi (RBT). This game has 3 levels based on difficulty. Chicks need to avoid viruses that are around and also avoid gathering together in one place.

III. METHODS

This game is designed using the ADDIE Model which contains five phases namely Analysis, Design, Development, Implementation and Evaluation. The programming language used uses the Scratch Application, which is programming using blocks. The research methodology is completely quantitative (quasi-experimental) involving a total of 20 year 1 student consisting of 10 boys and 10 girls. The student were divided into two groups equally, namely the control group that received the implementation of 'CHICK VS VIRUS' and the treatment group that received normal learning. This study involves a pre-test and a post-test. The data was analysed to obtain the mean value reading for the pre-test and post-test. Meanwhile, subject thematic are used to analyse student feedback.

Fig. 2 : ADDIE MODEL

A. Analysis

In this phase, the need to develop CHICK VS VIRUS is examined based on the analysis of documents.At this stage, objectives, problem statements, and the environment are studied to understand the project's goals.

B. Design

This stage covers technical design requirements such story board, audio, and template.

C. Development

During the development phase, we using scratch and using Youtube as guidance.

D. Implementation

In this phase,we have conducted a pre-test before students start learning using this game. This game was played by the treatment group for 3 sessions to strengthen their understanding.

E. Evaluation

During the evaluation phase, post-tests are conducted to assess the progress of students' knowledge and understanding. Additionally, interviews with students who have used CHICK VS VIRUS are also conducted to gather feedback from them.

IV. RESULTS AND FINDINGS

The test was conducted to 20 student as a respondent to evaluate the CHICK VS VIRUS. The findings of the study show; (a) the initial knowledge level of all students is at a medium level; (b) there is no significant difference in the mean score of the knowledge level of the control group before and after getting normal learning; (c) there is a significant difference in the mean score of the knowledge level of the treatment group before and after getting the implementation of 'CHICK VS VIRUS'; and (d) there is a significant difference in the mean score of increasing the level of knowledge of the treatment group with the control group.

V. CONCLUSIONS

In conclusion, it can be seen that 'CHICK VS VIRUS' can be used to enhance students' understanding about the spreading of virus. The use of teaching aids like this is crucial in helping students master the learning content. There was a significant improvement in students after using 'CHICK VS VIRUS'. As a suggestion for improvement, Game can be added with various levels of difficulty, additional information related to other viruses.

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The author would like to express gratitude to the administration and Science, RBT Panel of SK Merlimau, the lecturers at UiTM Jasin, and parents for their assistance and support in making the implementation of 'CHICK VS VIRUS' a success.

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