

# Workshop on Creating Game Using Scratch as an Activity to Support the Vision of Indonesia Gold 2045 at SMK Negeri 5 Pekanbaru

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## ABSTRACT

*In order to welcome creative industries that synergize with technology, the Indonesian government has begun to prepare a vision for the golden Indonesia 2045. One of its pillars is the development of Indonesian human resources along with the mastery of science and technology. To realize this vision, superior human resources possessing creativity, critical thinking, communication, and collaboration skills are needed. The right method in character building is the development of potential skills from early age with the help of the world of education. One of the formal educational institutions building students' characters to be skillful and competitive workforce, and developing entrepreneurial skills from an early age is vocational high school (SMK). Therefore, introduction of programming using Scratch to students of SMK Negeri 5 Pekanbaru is a learning method that is expected to develop the desired HR characters. Moreover, simple game creation training using Scratch can provide an overview of the use of simple coding as an introduction to how technology works. The activities were carried out in 4 method models, namely planning, action, observation, and reflection. The success rate of this activity is measured based on the results of score comparison between pre-test and post-test. The post-test results showed an increase of 96.67% compared to the participants' initial understanding.*

**Keywords:** *industri, teknologi, Visi Indonesia Emas 2045, coding, scratch*

## 1. INTRODUCTION

COVID-19 was a moment that has triggered the acceleration of the use of ICT around the world. Companies implement an online work system or work from home, students go to online school, the use of meeting applications is increasingly widespread and internet traffic movements increase as much as 60% in several countries (OECD, 2020).

Many countries formulated government policies by placing digital transformation in strengthening the state system to encourage economic growth and prosperity in this event. Regardless of how this crisis has caused problems in some aspects, there is no doubt that Covid-19 is causing technological disruption to accelerate. One of the countries that takes advantage of this moment of technological disruption is Indonesia. In September 2019, Bappenas published an article containing an executive summary of Indonesia's 2045 vision. The first pillar mentioned is Indonesian human resource development and mastery of science

and technology (**BAPPENAS, 2019**).

The maturity level of human resources in processing ICT is a determining factor for the progress of a country. The formation of a generation that will become the backbone of the country is certainly pinned to educational institutions from the elementary to tertiary levels. With the help of the formulation carried out by UNESCO, educational institutions carry out 4C learning movements, Critical Thinking, Communication, Creativity, and Collaboration (**Maria, 2019**). With this system, students are expected to be able to think critically, reason, be creative, communicate, collaborate and have problem solving skills (**KEMENDIKBUD, 2017**).

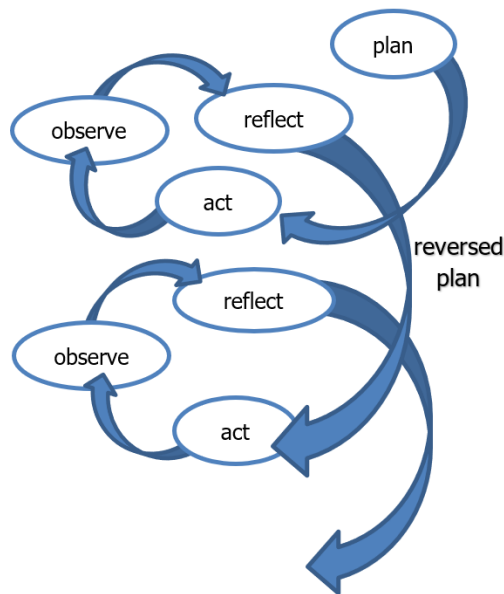
One of the educational institutions in Indonesia that is expected to be able to develop a 4C learning system, and in order to achieve the goal of the 2045 golden generation in all aspects, both in infrastructure, educator development, and so on, is SMK (Sekolah Menengah Kejuruan). SMK has a system by preparing its students to work according to their respective interests. Graduates must have the character of a skilled and competitive workforce, and be able to have an advantage in entrepreneurship (**SMK KEMENDIKBUD, 2022**).

To encourage educational activities with the 4C learning method on the emergence of technology that has a negative impact on the younger generation, where they tend to enjoy rather than make, community service is proposed with the title "Workshop in Game Making Using Scratch as an Activity to Support the Vision of Indonesia Gold 2045 at SMK Negeri 5 Pekanbaru "

Through collaborative learning with higher education institutions, and by using the workshop method, students are expected to understand practical theoretical concepts so that they can increase student competence. The collaboration carried out in this PKM activity is a programming language workshop. This activity is carried out by providing the basic concepts of programming languages. Students are required to be able to think logically so that coding can run smoothly and fix it properly when a coding error occurs. By solving these problems, students are expected to be able to develop a mindset and encourage creativity in solving a problem.

## 2. METHODS

The method applied to this community service activity is to provide training which is carried out for one day as shown in figure 1. The actions taken in this activity absorb the spiral research model from Kemmis & McTaggart (1988). In essence, this method has a core cycle, namely the process of planning, action, observation, and reflection (**Kasbolah, 1998:124**).

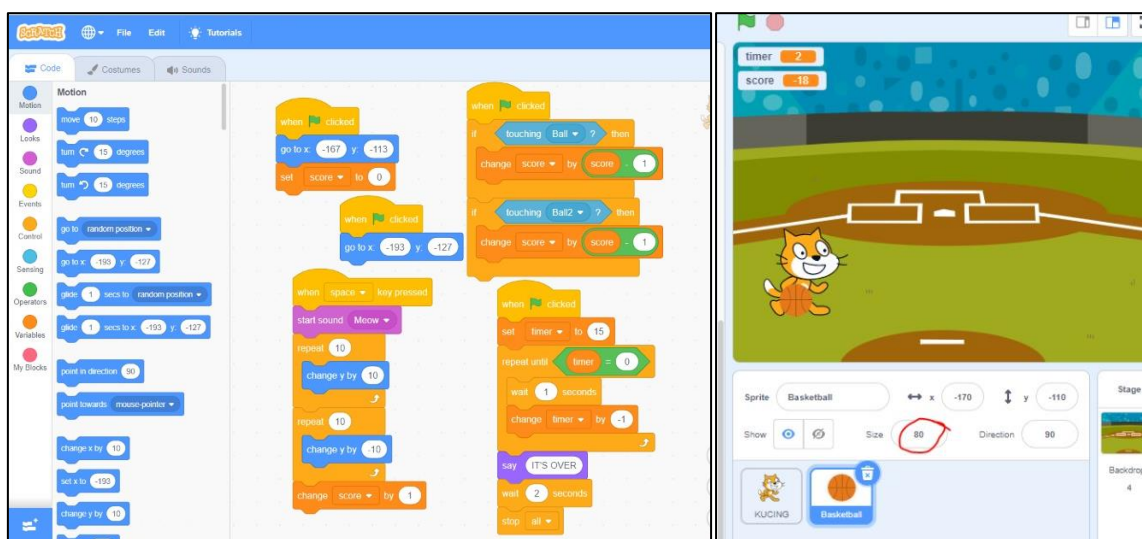


**Figure 1. Kemmis & McTaggart's Methods (Achmad, 2013)**

**2.1. Planning**

Prior to the activity, the 2022 PCR community service activity (PKM) team conducted a Focus Group Discussion (FGD) with Mr. Gilang. He is a staff teacher of SMK Negeri 5 Pekanbaru. It was from him that the PKM team got an idea of what and how the Project Base Learning (PjBL) activity process should be carried out at SMK Negeri 5 Pekanbaru.

From the results of discussions conducted with Mr. Gilang, the programming language training method using scratch was deemed suitable for students of SMK Negeri 5 Pekanbaru. Then the PKM team made the preparation of activity plans, formulation of costs, and the composition of the PKM team that involved students. Collaboration involving PCR students in this activity can be part of the application of the skills acquired during studying at the Polytechnic Caltex Riau. The scratch modul activity is showed in figure 2.



**Figure 2. Scratch Modul Activity**

## 2.2. Action

The activity was carried out in 1 day for 3 hours, from 7.30-10.30 AM. The program began with pre-test activities, then technology development seminars, scratch training, and finally the post-test were done. The activity team consisted of 2 lecturers as presenters and supervisors, and 10 Caltex Riau Polytechnic students as group supervisors. In order for the training to work optimally, the training students were divided into 10 groups, where 1 group consisted of 3 students from SMK Negeri 5 Pekanbaru and 1 student as a group supervisor. Figure 3 shows workshop of digital development and the importance of additional skills in understanding ICT systems.



**Figures 3. Workshop of Digital Development and The Importance of Additional Skills in Understanding ICT Systems**

## 2.3. Observation

**Table 1. Activity Rundown**

No	Activity Rundown	Duration	Detail	
1	07.30-08.30	Opening Ceremony	30 min.	Welcoming and Material Explanation
		Pre-test	30 min.	Prior Knowledge Identification
2	08.30-10.00	Scratch	1 H.	Main Activity
		Challenging	30 min.	Gaming Design
3	10.00-10.30	Post-test	30 min.	Evaluation
		Classing Ceremony	30 min.	Conclusion

Table 1 shows activity rundown. The opening activity of the workshop was an explanation of material about the development of industrial technology 4.0, Indonesia Gold 2045 and 4C learning methods. Then proceed with the initial introduction to a simple programming language that is integrated in the scratch module. The pre-test and post-test work activities are the identification steps for the PKM Team in knowing and understanding the level of success of the activity.

During the workshop, the enthusiasm of the students of SMK Negeri 5 was considered very good. This was marked by an intense question and answer process between the participants and the team that provided the material. The post-test scores that became the validation material for the identification of participants' enthusiasm obtained very good changes.

## 2.4. Reflection

In order to see the level of success of the event, the PKM team carried out a process of identifying student knowledge stages, namely pre-test and post-test. The identification test contains scratch programming, English terms commonly used in programming languages and the basic logic of workflow problems to obtain solutions. The pre-test is an initial assessment of students' basic understanding before the training is held, while the post-test activity is the identification validation stage after the workshop. Figure 4 shows Workshop Participants Enthusiasm during the activity.



**Figure 4. Workshop Participants Enthusiasm**

## 3. RESULT AND DISCUSSION

### 3. 1. Identification of Students' Prior Knowledge


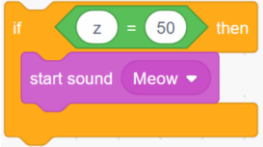
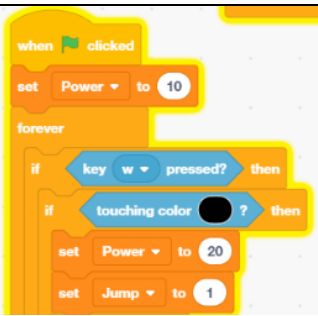
After the opening ceremony and explanation of the material objectives of the activity, the identification of basic knowledge is then held. The pre-test was carried out as a method of assessing the initial identification of students' knowledge levels before being given training in programming language workshops using scratch. There are 5 question points which are categorized into five categories, namely good (correct score > 80%), enough (correct score 60-80%), less (correct score 40-60%), very poor (correct score < 40%). Based on Table 3, the results of the pre-test were obtained that 86% of the total participants did not understand the basic concepts of programming languages. Figure 5 shows Pre-Test Preparation of the participants.



**Figure 5. Pre-Test Preparation**

The questions are as in the table 2.

**Table 2. The Question List**

No.	Questions	Obj.	Answered
1	Scratch is an apps for?	a. Animation and Game b. Video and Animation c. Audio and Video d. Game and Audio	a
2	 This block means...	a. you can move the script after press "1" second b. wait for the specified time c. run the script in the block repeatedly d. after 1 sec., the script start play	b
3	 Look at the block diagram on the side. The computer starts to turn on the sound when?	a. program runs b. the conditions are accomplished c. there is a "meow" sound d. Z= 50	d
4	 From the picture, what are the variables?	a. Forever and IF b. Power and Jump c. Key and Touching d. Set and Then	b

<p>5</p>	<p>The sequence of commands if the space button is pressed the "sprite" moves forward is</p>		<p>a</p>
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### 3. 2. Workshop Process

The workshop process was carried out in one of the computer laboratory rooms of SMK Negeri 5 Pekanbaru. The slide reference for the activity seminar consists of four bibliography, namely a summary of books published by Deliberately Digital (**Hubert, et al., 2020**) which explains the history of digital technology; Deloitte Insights (**Rene, et al., 2017**) as a reference material for knowledge on the development of Industry 4.0; IoT references from the Journal of Big Data (**Sachin, 2019**); datareportal as information on insights and trends around the world; as well as the objectives of the activities contained in the articles of Bappenas (**DataReportal,2022**).



**Figure 6. Focus Discussion Group**

Next, the main agenda was the explanation of programming language material. In this activity students were given an initial explanation in order to understand the basic concepts of using scratch then students were invited to participate in working on the material. In between group

activities, students were challenged to find solutions to problem conditions. Figure 6 and 7 shows the workshop process.



**Figure 7. SCRATCH Programming Explanations**

### 3. 3. Evaluation

The stage of the activity's evaluation used the post-test method. The percentage of post-test scores obtained is very significant compared to before the initial material was given.

**Table 3. Average Results of Students' Basic Knowledge Before and After the Activity**

Activity	Categories			
	Good	Enough	Less	Very Poor
<i>Pre-test</i>	-	-	14%	86%
<i>Post-test</i>	96.67%	3.33%	-	-

The post-test result shows an increase in students' understanding after the PKM training activity was held. This becomes an evaluation material that the PKM activities have been very well understood by the students of SMK Negeri 5 Pekanbaru. After all of workshop agenda is done, the participants are taking photo session as shown in figure 8.



**Figure 8. The Closing Workshop Activities- Photo Session**

## 4. CONCLUSIONS

Community service activities for the students of SMA Negeri 5 Pekanbaru have been carried out very well. Before the training activities were held, the pre-test assessment showed that



there were no students who understood the basic concepts of programming languages well, but after the activities were held, it showed that there was a significant improvement where 96.67% of participants had understood the training material well. The value of the post-test implementation can be categorized as satisfactory and it can be concluded that the training activities have been successfully held.

In the future, we hope that this activity will be carried out in a number of schools, both elementary, junior high and high school so that the academic community will become familiar with the working concept of digital technology, as well as the introduction of logical programming learning methods can use other media methods besides Scratch.

### **ACKNOWLEDGEMENT**

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