

Improving Creative Thinking Skills Using Project-Based Learning Integrated with Electronic Modules on Post-Covid-19 Viruses



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ABSTRACT: The coronavirus outbreak has a huge effect on the world, especially on education in Indonesia. Learning during the pandemic had the impact of decreasing students' thinking abilities, one of which was the skills to think creatively. The decline in students' thinking ability still occurs during endemic periods, such as decreased student interest in learning, less active students in learning activities in the classroom, and changes in student study habits. Electronic modules are an alternative that is used in learning during endemic times. This research was conducted at four schools in the province of Banten, which aims to find out the increase in students' creative thinking abilities by using electronic modules that are integrated with project-based learning. Data were obtained based on quantitative methods based on pretest and posttest values adjusted for creative thinking indicators. Normality and homogeneity tests were carried out on the samples to find out the similarity of the samples taken. Based on the test findings, it is possible that there is a significant increase in students using electronic modules. In addition, the module is also declared to have high effectiveness based on the n-gain score test.

KEYWORDS: creative thinking skill, education, electronic modules, integrated learning, project-based learning

I. INTRODUCTION

The coronavirus outbreak has had a big impact on the world, especially in Indonesia. The public is asked to always keep their distance, avoid all activities that involve many people, and always maintain personal and surrounding hygiene. The coronavirus outbreak has also affected the education system in Indonesia, where there have been many policy changes in learning, work, and worship activities that must be done at home (Darmalaksana, 2020). The impact of the pandemic has caused drastic changes and suddenly in all aspects of life, including education. With the corona outbreak, the Indonesian government was forced to stop classroom learning to stop the virus from growing.

At the educational level from elementary school to tertiary institutions, it seems as if they are "forced" in adapting to the surrounding conditions (Ariyandi, 2020), distance learning is mandatory for teachers in Indonesia (Atsani, 2020) which is an effort to stop the spread of Covid in Indonesia (Ministry of Education and Culture, 2020). Online learning systems are applied use of communication and information technology such as Zoom, Whatsapps Group, Youtube, Google Classroom, and so on (Habibah et al., 2020). Teachers are required to be proficient in using online learning media and ensuring learning activities in schools continue during the Covid-19 pandemic so that teachers are expected to be able to plan media learning as an innovative way by making use of online media (Fauzi, 2020).

Ode et al., (2021) said that during the pandemic the level of students' understanding of the material decreased due to various factors, such as the teacher's lack of readiness to use media, inadequate network access, quota limitations, limited cellphone ownership and limited online classroom experience. According to Dewi (2020), due to the emergence of various problems, the value of the quality of education in Indonesia has dropped. President Joko Widodo announced that the government declared a transition from a pandemic to an endemic period on Wednesday, June 21, 2023. This endemic period is a transitional period in adjusting conditions from online learning to offline learning again. Indirectly the habits of all activities become changed in their implementation. New policies in the world of education are very reasonable by adjusting conditions to achieve the targets that have been planned (Untari, 2020).

Policy changes in Education affect changes in students, such as a lack of interest, and changes in student study habits. Students who are used to carrying out online learning become less active in offline learning activities. Interest in learning is something that encourages someone to carry out learning activities where they are free to choose what they will do without any pressure from others (Heryyanti, et. al., 2021). Students who have interests are not easily discouraged when given a lot of homework and are not

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easily distracted by the conditions that occur around them that affect their academic success (K.P. Rahmawati et al., 2018). Learning habits affect the choice of learning methods, create learning situations and encourage student learning activities that are suitable for themselves (Ningsih et al, 2014).

The impact of the learning transition in Indonesia affects learning activities in schools. Teachers are required to innovate, because Indonesia needs innovation in aspects of education, especially in the field of technology. Academic Qualification Standards and Teacher Competency, explained that teachers must take advantage of current developments information technology and communication for the benefit of learning activities in the classroom. Government regulations of the Republic of Indonesia state that the use of technology must be mastered by teachers with pedagogic competence. Media choices must be made in the learning activity so that it allows students to have interaction with the chosen media (Rahim, et. al., 2019). Media selection greatly influences the achievement of learning objectives (Nafisa & Wardono, 2019).

Electronic modules (E-modules) are one of the media that can be utilized in learning in endemic times. The Electronic Module is an effective and efficient digital media and prioritizes student independence in carrying out learning activities that contain learning media to help students solve problems in their way (Fausih and Danang, 2015). Electronic modules are self-controlling, independent, stand-alone, adaptive and easy to use, and contain learning materials following the syntax of the learning model. Project-based learning is a model that is integrated with an electronic module. PjBL can effectively improve students' creative thinking skills. PjBL focuses on meaningful life problems for students, and the role of the teacher facilitates in presenting problems, asking questions, and designing projects for students to work on (Anggreni, et al, 2020).

Creative thinking is a way of thinking that fits the needs and urgency of the moment, including new ideas that are realized in newness of ideas in products that are intellectual, artistic, and hands-on (Al-Hassawi, F.Y., et.al., 2020). Creative thinking is one of the requirements of 21st-century learners because thinking skills have to be teach and incorporated in the school curriculum, to set up students to be able to adapt and cope with current needs (Khwaldah, 2015). Creative thinking is a thought process that generates a wide variety of possible ideas and ways (Noviyana, 2017). Creative thinking is a mental activity that is used by someone to build, and produce new ideas or ideas (Rosita & Nur, 2016). Students' creative thinking abilities are needed and need to be developed so that students can develop their knowledge and skills by using these thinking skills.

The description above is the background for the author to carry out the writing entitled "Improvement Creative Thinking Skills Using Project-Based Learning Integrated Electronic Modules in Endemic Periods" with the hope that the contribution of this writing can develop innovation in learning that utilizes current technology.

METHOD

Research conducted in four classes of four schools in Banten Province which were selected by random sampling technique. In this study, the samples studied were 11th-grade students of State Senior High School 3 Serang City, State High School 1 Ciomas, State High School 3 Rangkasbitung, and State High School 1 Cilegon, totaling 128 students.

In this study, it was identified by quantitative data on students' pretest and posttest, which were then tested with the help of IBM SPSS Statistics 26 software. The data was then analyzed qualitatively to conclude the increase in students' creative thinking abilities by using electronic modules integrated with project-based models. learning. The effectiveness of the electronic module is seen based on the assessment of the test scores done by students. Student learning outcomes can be analyzed as follows:

$$\% \text{ Learning Outcome} = \frac{\Sigma \text{ acquisition score}}{\Sigma \text{ maximum score}} \times 100 \%$$

The sample in this study was tested first by testing the similarity of the initial conditions using the normality test and homogeneity test using the problem instrument.

Normality test

The normality test aims to find out if the samples taken are normally distributed so that the research conclusions drawn from some samples can be justified. In this study, the normality test used IBM SPSS Statistics 26 software. The normalization test results used the Kolmogorov-Smirnov results because more than 50 samples were taken. In the normality test, the basic decision-making is as follows (Ghozali, 2016):

- Not normally distributed if the significance value is < 0.05
- Normally distributed, iff the significance value is > 0.05

Homogeneity Test

The homogeneity test aims to find out the similarities in the variants of the research data taken. The basis or guideline for decision-making in the homogeneity test is as follows (Widiyanto, 2010):

- Not homogeneous, if the significant value is < 0.05

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- Homogeneous, if the significant value is > 0.05

Then student learning outcomes are obtained and converted with creative thinking criteria adapted from Ekawati & Sumaryanta (2011) as follows:

Table 1. Criteria for Creative Thinking

Criteria	Score
Very creative	86-100
Creative	71-85
Creative enough	56-70
Less creative	41-55
Not creative	<40

The learning outcomes value data is then tested using the normalized gain test. The n-gain test is used to find out the increase in students creative thinking skills using electronic modules in the PjBL model. According to Hake (1998), the results of the normalized gain score are divided into three categories which can be seen in the following.

Table 2. N-Gain Criteria

Classification	Presentation
Low	$<g> < 0.30$
Currently	$0.30 \leq <g> < 0.70$
High	$0.71 \leq <g> < 1.00$

RESULT AND DISCUSSION

RESULT

Learning activities at State Senior High School 3 Serang City, State Senior High School 1 Ciomas, State Senior High School 3 Rangkasbitung, and State Senior High School 1 Cilegon are carried out using electronic modules that are integrated with project-based learning models. The syntax of the PjBL model is to find out the initial question, plan the project, construct a schedule, track student and project progress, judge the results, and evaluate the experience. The test in this study is following the indicators of creative thinking ability. Indicators of creative thinking are fluency, flexibility, originality, and elaboration.

Table 3. Creative Thinking Skills Questions

Components of creative thinking	Number Question	Question
<i>Fluency</i>	1	Able to express answers very precisely and fluently about the elements in theatrical performances
<i>Flexibility</i>	2	Being able to show the ability to change the way of solving a problem that occurs flexibly
<i>Originality</i>	3	Able to give different answers from the others based on the results of the imagination by utilizing the objects around
<i>Elaboration</i>	4	Develop, add, enrich, and expand a story theme in detail by mixing traditional and modern tales

The results of students' creative thinking skills are obtained from the test scores taken by students, which are then analyzed. The effectiveness of the electronic module is known from the N-gain value. The results of the test scores are categorized as follows:

Table 4. Summary of Test Results from Creative Thinking

Data	Category	Very creative	Creative	Pretty creative	Less creative	Not creative	Amount
Pretest	SSHS 3 Serang City	0%	0%	3%	19%	78%	100%
	SSHS 1 Ciomas	0%	0%	3%	28%	69%	100%
	SSHS 3 Rangkasbitung	0%	0%	3%	22%	75%	100%
	SSHS 1 Cilegon	0%	0%	13%	16%	72%	100%
Posttest	SSHS 3 Serang City	19%	56%	25%	0%	0%	100%
	SSHS 1 Ciomas	31%	50%	19%	0%	0%	100%
	SSHS 3 Rangkasbitung	19%	50%	31%	0%	0%	100%
	SSHS 1 Cilegon	16%	63%	22%	0%	0%	100%

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The following diagram shows the test results of students' creative thinking skills for each indicator:

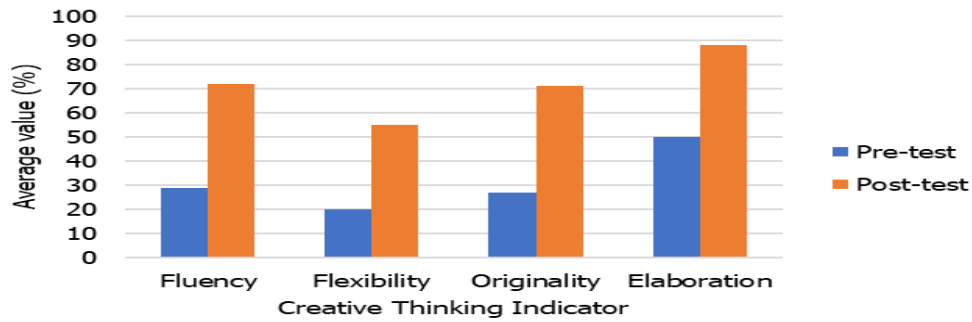


Figure 1. Test results for each indicator

After knowing the improvement in student tests, then test the effectiveness of electronic modules in improving creative thinking skills. Before carrying out the N-gain test, a prerequisite test is carried out, including:

Normality test

In this study, the normality test used IBM SPSS Statistics 26 software, namely the Kolmogorov-Smirnov, and Kolmogorov-Smirnov tests, the following results were obtained:

Table 5. Normality Test

Data	Mark	Information
Normalitas Ngain score	SSHS 3 Serang City	0.091
	SSHS 1 Ciomas	0.130
	SSHS 3 Rangkasbitung	0.200
	SSHS 1 Cilegon	0.200

Data is normally distributed

Significance of normality in this research is $\alpha = 0.05$, so it can be concluded that the data on State Senior High School 3 Serang City, State Senior High School 1 Ciomas, State Senior High School 3 Rangkasbitung, and State Senior High School 1 Cilegon is normally distributed.

Homogeneity Test

To find out data from populations that have the same variant, a homogeneity test is carried out. In the homogeneity test using the IBM SPSS Statistics 26 software, namely the Levene test and the significance value obtained on homogeneity is 0.065 so it concluded as follows in State Senior High School 3 Serang City, State Senior High School 1 Ciomas, Rangkasbitung 3 State Senior High School, and Cilegon 1 State Senior High School were homogeneous.

Ngain Test

The next step is to find out the effectiveness of PjBL integrated electronic modules, then the n-gain test is carried out. Field testing in this research contains the value data of creative thinking skills for grade 11 students of State Senior High School 3 Serang City, State Senior High School 1 Ciomas, State Senior High School 3 Rangkasbitung, and State Senior High School 1 Cilegon. The creative thinking ability data was obtained from the test scores, then analyzed with the N-gain value to find out the effectiveness of the PjBL electronic module. Normalized gain is carried out through an analysis of the normalized gain score $\langle g \rangle$ and then compared with the category proposed by Hake (1998). In this research, the N-gain test, the following results were obtained:

Table 6. N-Gain Test

School	Gain Score	Classification
SSHS 3 Serang City	0.71	High
SSHS 1 Ciomas	0.73	High
SSHS 3 Rangkasbitung	0.68	Currently
SSHS 1 Cilegon	0.66	Currently
Average	0.70	Currently

DISCUSSION

The prerequisite tests carried out in this study found that the samples taken had similarities through normality and homogeneity tests. Based on these tests, the research can be continued. The research was carried out by carrying out learning activities using

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electronic modules integrated with PjBL models. Before using the electronic module, a pretest is given based on indicators of students' creative thinking abilities. After implementing learning activities using electronic modules, students are given a posttest to define the improvement of students' creative thinking skills in using electronic modules and the effectiveness of electronic modules.

In each PjBL model syntax can improve students' creative thinking. During the implementation of this research, indicators of creative thinking ability were used in the PjBL model, as follows:

1. Fundamental Question Adventure Stages

At this stage, a video of the theatrical performance is shown. Students then formulate various questions related to the video shown. Question and answer activities are carried out based on questions formulated by students. Students take turns answering questions and giving various answers according to the student's point of view. This activity can improve students' creative thinking skills on the fluency index. Fauziah (2011) argues that the way to develop students' fluency of thinking is by conducting questioning activities. The answers that students give can show that the assumptions made are quite good when many of them answer with appropriate explanations. Assumptions should be considered to accept, reject or defer judgment on a decision seriously and thoroughly (Ilham, 2018).

2. Project Design Stage

At this stage, students design a project. At this stage, three tasks must be done in groups. The first task of students is to design and find out the characters that will be displayed in theatrical performances. Students discuss determining the figures, characters, themes, and descriptions of the scenes that are used as the initial design of the show. This activity can enhance creative thinking skills on indicators of generating various ideas about theater performances (flexibility). Students' flexibility in solving problems is a step that can lead students to acquire new knowledge. Creative thinking leads students to gain fresh insights, a new approach, a new prospective and a new way of knowing things. Students will get many different points of view based on their comprehension and ability to provide flexible alternative answer to the problems given (Salim, 2017).

In the second task, students creatively design costumes and props by combining traditional and modern elements into new ideas. This activity can improve the ability to think creatively on indicators of providing different and new ideas and answers (originality). In the third task, students carry out the arrangement of elements of the performance, based on a predetermined design format with the theme fantasy of youth. This activity can improve the ability to think creatively on indicators of developing, adding, and enriching a performance idea (elaboration). Through activities and different topics, it can allow students to be able to see a variety of issues so that students' skills become more skillful (Agustia et al., 2015).

3. Schedule Arrangement Stage

At this stage, students make schedules for modern theatrical performances. The schedule made contains details of the time of modern theatrical performances. The schedule is used by students as a time reference in project learning activities. This activity can improve students' creative thinking skills in the elaboration indicator. At this stage students are asked to be able to manage time to achieve the desired goals. Good time management skills in students will affect their academic success (Puspitasari, 2013).

4. Student Monitoring and Project Progress Phase

At this stage, the teacher monitors student activities in making a performance project with a link to the electronic module, and students report every activity students do. This activity can improve the ability to think creatively on the indicators of developing, adding, and enriching an idea for a performance (elaboration) because in monitoring the progress of the project each student provides detail on each assignment given. This stage monitors students interacting actively and positively in groups in a comfortable and not threatened atmosphere (Hidayat, 2022). Education must be able to facilitate and encourage so that it can optimize and awaken students' potential, and encourage active initiative and creativity to ensure dynamics in the learning process (Handoyo, 2021).

5. Results Assessment Stage

This stage is carried out by the teacher conducting an assessment based on the assignments that students are working on. This activity can improve the ability to think creatively on indicators of developing, adding, and enriching an elaboration idea because in the assessment of results each teacher assesses student assignments in detail. The assessment activities carried out start from the brainstorming process to the project results. Brainstorming is a process that involves not only cognitive but also affective elements (Doğan and Batdı, 2021).

6. Experience Evaluation Stage

At this stage, the teacher carries out evaluation activities by asking students to share their experiences in the project of making modern theater performances. Students take turns expressing their ideas and being responded to by other students. The responses that students gave were based on the development of other students' ideas. This activity can improve students' creative thinking skills on the fluency indicator. Evaluation is carried out to obtain the impact of learning activities that have been carried out in the

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form of overall student learning results, includes the learning process knowledge, conception, behavior, and skills (Nuriyah, 2014). In evaluation activities, selection, collection, analysis, and presentation of information are carried as a foundation for decisionmaking and organization for further learning activities (Gunawan, 2011).

CONCLUSIONS

It was concluded that there was an increase in scores on each indicator of creative thinking ability with electronic modules integrated with project-based learning in grade 11 in Banten Province. The electronic module was declared effectiveness in increasing the creative thinking skills of students based on the n-gain average. Project-based electronic modules still have the potential to be further developed based on adjustments to the needs in the field.

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