

IMPLEMENTATION OF THE INQUIRY-FLIPPED CLASSROOM MODEL ASSISTED BY EDPUZZLE ON STUDENTS' CREATIVE THINKING

Astri Prasetia¹, Hamidah Suryani Lukman², Yanti Mulyanti³

^{1,2,3}Mathematics Education Study Program, Faculty of Culinary Arts and Education, University of Muhammadiyah Sukabumi
e-mail: 1astriprasetia04@ummi.ac.id

Abstract

The purpose of this research is to improve the creative thinking ability of SMP Negeri 1 Cibadak students through the application of Inquiry-Flipped classrom assisted by Edpuzzle. This quantitative research uses a pseudo-experimental method and a control group of pretest and posttest. There were two subjects involved, namely two experimental classes and one control class with a total of 91 students in grade VII of SMP Negeri 1 Cibadak. To analyze the data, a single-track anava test was used with prerequisites, normality and homogeneity tests. A creative thinking ability test instrument was used in this study which showed the findings that the Inquiry-Flipped Classroom model assisted by Edpuzzle was better than the Inquiry-Flipped Classroom model and direct learning.

Keywords: Inquiry, Flipped classroom, edpuzzle, creative thinking

Abstrak

Tujuan penelitian ini untuk meningkatkan kemampuan berpikir kreatif siswa SMP Negeri 1 Cibadak melalui penerapan Inquiry-Flipped classrom dibantu Edpuzzle. Penelitian kuantitatif ini menggunakan metode eksperimen semu dan control grup pretest dan posttest. Terdapat dua subjek yang terlibat yaitu dua kelas eksperimen dan satu kelas kontrol dengan jumlah 91 siswa kelas VII SMP Negeri 1 Cibadak. Untuk menganalisis data digunakan uji anava satu jalur dengan uji prasyarat, normalitas dan homogenitas. Instrumen tes kemampuan berpikir kreatif digunakan dalam penelitian ini yang menunjukkan hasil temuan bahwa model Inquiry-Flipped Classroom berbantuan Edpuzzle lebih baik dibandingkan dengan model Inquiry-Flipped Classroom dan pembelajaran langsung.

Kata kunci : Inquiry, flipped classroom, edpuzzle, berpikir kreatif

INTRODUCTION

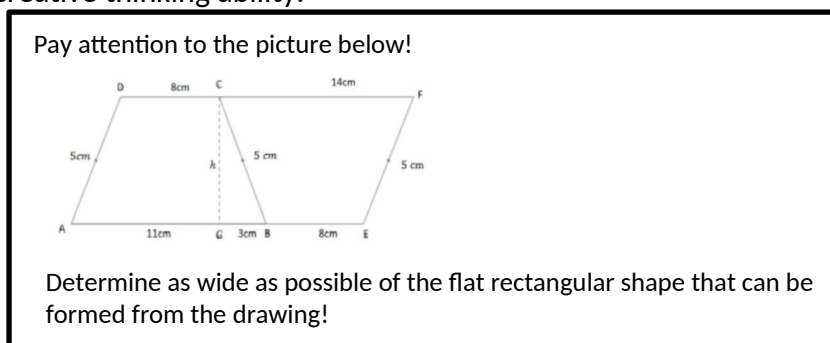
The independent curriculum program emphasizes students' freedom and creative thinking (Rahayu et al., 2022). Developing pupils' capacity for creative thought is one of the learning goals. (Wicaksono et al., 2022). According to (Pangestu & Hasti Yunianta, 2019) It is crucial for pupils to be able to think mathematics creatively in order to stimulate their curiosity and support them in asking questions, solving issues, and coming to meaningful conclusions. Pupils with creative thinking skills will generate a wide range of ideas, and they will be able to identify the best solutions to issues based on these ideas (Amin & Ibrahim, 2022). This creative thinking should be applied, particularly in math lessons to help students solve problems by formulating, interpreting, and solving problems (Saidah, Dwijanto, 2020). Current educational activities in Indonesia have not supported the development of student

creativity. As a result, it can cause problems for students such as inhibition of the creative thinking process and their inability to understand and analyze problems (Zahra & Solihati, 2023). Nonetheless, the data indicates that pupils' capacities for mathematical creativity have not been fully developed (Dalilan & Sofyan, 2022; Lestari & Sofyan, 2013). Because creative thinking skills are not paid attention to when learning mathematics (Hasanah, 2021). The results of the Program for International Student Assessment (PISA) survey in 2022 show that the creative thinking of Indonesia students in mathematics still gives poor results. The following is a complete list of students' answers.

Table 1. Percentage of Completeness of Students' Initial Observation Answers

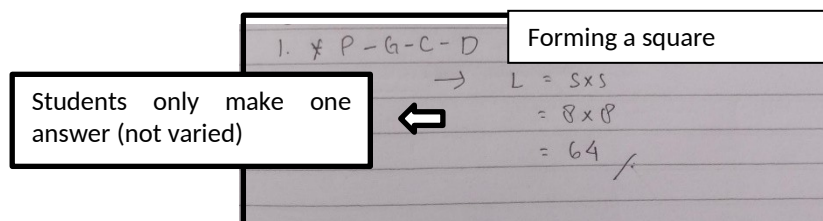
Indicators	Number of Indicators fulfilled			
	0	1	2	3
Number of Students	9	15	3	3
Percentage	30%	50%	10%	10%

Seen in the table above It was found that students had not met the fluency indicator stage of around 93.09%. In order for many students to be unable to comprehend the knowledge they have been given and to be unable to approach challenges in a variety of ways and with proper thinking. Observation was made by providing problems related to the Rectangular Flat Building material. Here is one of the answers of students who have not met the skills of creative thinking ability.



Source: (Putri et al., 2021)

Picture 1. Initial Observation Questions



Picture 2. Student answers

In picture 1 and picture 2 are the students' answers which can be seen that students only make one rectangular answer and do not know the problem well. While the first

indicator of creative thinking is *Fluency* (Fluentness) related to this, students must be able to solve problems with correct, correct and not diverse answers. Therefore, students can be declared unable to meet any indicator of creative thinking ability. Several factors that cause students' weak mathematical creative thinking skills (Sumartini, 2022). One of them is a lack of training or exploring students' creative thinking skills (Rozi & Afriansyah, 2022). The Inquiry learning methodology is a viable option for use.

The inquiry learning model is a process that fully engages students in learning by asking questions, investigating, and creating new knowledge and things. This model, the teacher is only a facilitator who leads students throughout the learning in the classroom. The inquiry learning model aims to encourage students to be more creative and critical (Aprilia, 2020).

But this model also has a small flaw in the way it works, which is that it is hard to monitor student success and activities. This model is also hard to use because it involves students' learning habits and takes a long time to implement, which makes it hard for teachers to adjust it to the scheduled time.

To support learning more effectively, it is necessary to add a learning model, namely the flipped classroom model. This flipped classroom approach to education links technology-based instruction to engaged student learning. In this learning, students can learn the material at home before learning in class through assignments given by the teacher. So, teachers here play the role of facilitators who help create digital teaching materials, such as videos and other media. However, the Flipped Classroom learning model has its drawbacks, one of which is that teachers cannot control whether students understand what is being taught (Fauzan et al., 2021). Therefore, there needs to be a media that can control students in learning at home. One of the media that can be used is interactive video learning media (Edpuzzle).

Edpuzzle is an interactive video-based learning medium where students not only watch video materials but also work on problems to test their understanding. Thus, allowing teachers to supervise students working on the content in the media. In line with the statement (Amaliah, 2020) Edpuzzle is a web that is used as an interactive video-based learning medium to make learning more interesting. Edpuzzle allows teachers to organize

classes to transcribe videos for students. Since quizzes are incorporated into the video, teachers can tie video content directly to the assessment (Hamid B & Suryadi, 2021).

Additionally, based on the findings of the study carried out by (Paristiowati et al., 2017) The inquiry-flipped classroom model's impact on students' performance in terms of chemical reaction rate. Learning through the inquiry-flipped classroom approach yields higher understandings than learning through traditional classroom methods. In the meanwhile, the findings of the study (Desmarani et al., 2021) . named "Inquiry-flipped classroom using e-LKPD development" It hasn't worked as well in field tests when it comes to fostering kids' capacity for original thought. And the results of the research conducted (Agustin et al., 2024) Edpuzzle app-based learning media is great and worth using to help students learn. So that the Inquiry-Flipped Classroom model assisted by Edpuzzle will be used to see if it can provide an improvement in students' creative thinking skills.

We will employ the Inquiry-Flipped Classroom method with the aid of Edpuzzle. It is anticipated that this most recent advancement will assist students in enhancing their still-relatively-low creative thinking abilities.

METHOD

This study uses a quantitative method. Because this research focuses on the collection of statistical data and the results of data analysis (Sugiyono, 2022). The research method used in this research is a quasi-experiment, because not all relevant variables are controlled in this study (Sugiyono, 2019). This study uses a research design that randomly selects classes, namely control group and posttest.

There are three classes in this study, specifically, one control class and two experimental classes. The first experiment uses the Inquiry-Flipped Classroom learning model assisted by Edpuzzle, the second experimental class uses the Inquiry-Flipped Classroom model and the control class uses the direct learning model. This is based on the idea of (Sugiyono, 2017) that the three research designs were randomly selected and then given a pretest to find out the initial condition and a posttest to find out the condition after being given treatment.

The 318 participants in the study's population for 2023–2024 are all of the grade VII pupils enrolled at SMP Negeri 1 Cibadak Sukabumi Regency. In addition, three groups were

selected as samples specifically, the control class, experimental class II, and experimental class I.

This study uses two types of instruments, namely test and non-test instruments. There are three data collection methods used, namely test, observation and documentation. Validity, reliability, differentiation and difficulty tests are part of the test instrument that has been tested before the test instrument is used. Furthermore, there are two types of validity that are carried out, namely the validity of the content given to experts in the field and the validity of construction that links the student score for each question with the score of their work. The findings of the test instrument are shown below:

Number	1	2	3
Content validity	Valid	Valid	Valid
Construction Validation	Valid	Valid	Valid
Reliability	Very High		
Power of Difference	Good	Good	Enough
Difficulty Level	Keep	Keep	Keep

Based on the table above, it shows that this instrument can be used in research. It is hoped that the test instrument will produce answers including indicators of creative thinking ability as follows:

Indicators	Description
Fluency	Fluency is a person's ability to generate a lot of relevant ideas or ideas quickly, use ideas or ideas obtained fluently, actively ask questions, complete tasks faster, and do more work than others.
Flexibility	Flexible means having the ability to think in different ways, see from different points of view, interpret problems with many interpretations, and change one's mind spontaneously.
Originality	Originality means the ability to acquire new ideas that no one else has ever seen.

The collection stages are carried out using various techniques, namely tests, observations and documentation. Three pretest and posttest questions are used to measure students' creative thinking capacity. The data gathered from the study findings were analyzed using three different methods: the three-sample balancing test, the hypothesis test, and the data analysis of observation sheets.

1. Three-Sample Balance Test

The feasibility test is a test of the pretest value carried out before the experimental process takes place. The purpose of this test is to find out if the capabilities

of the sample are comparable. The single-track anava test is used to test the balance with the prerequisites of normality and homogeneity tests.

2. Hypothesis Test

The hypothesis test used is a single-track anava test. The goal was to find out if there was a difference in creative thinking ability from the average of the three samples. The post-anava scheffe test was conducted to find out which learning model is better for students' creative thinking skills. The purpose of this post-anava scheffe test is to determine which learning approach is most effective on students' creative thinking skills.

3. Observation Sheet Data Analysis

The treatment steps that would be administered in the experimental class I, experimental class II, and control class were the basis for creating the observation sheet for this study. This observation sheet's objective is to gather organized data on the actions of educators and learners during the educational process. Meanwhile, the data analysis used is a Likert scale.

RESULTS AND DISCUSSION

1. Three-sample Balance Test

a. Normality Test

The normalcy calculation using the Liliefors test at the 5% significance level yielded the following findings.

Table 4. Pretest Data Normality Test Results

Sample	N	L_{max}	L_{table}
Experimental Class I	31	0,1224	0,1591
Experimental Class II	30	0,1353	0,1610
Control Classes	30	0,1217	0,1610

Based on the Liliefors normality test calculation, the findings indicate that $L_{max} < L_{table}$, up to H_0 Accepted. Each sample group therefore originated from a population that was regularly distributed.

b. Homogeneity Test

At the 5% significance level, the following are the findings of the homogeneity test computation using the Bartlett test.

Table 5. Pretest Homogeneity Test Results

Sample	Variance	B_{count}	B_{table}
Experimental Class I	108,5	0,9756	0,9331
Experimental Class II	63,01	0,9756	0,9331
Control Classes	81,42	0,9756	0,9331

Result account Homogeneity test using the Bartlett test shows $B_{\text{Count}} > B_{\text{table}}$, until H_0 is accepted. Thus, all sample groups came from homogeneous variance populations.

c. Anava Test

The results of the anava test of one cell line are not the same as the significance level of 5% are as follows.

Table 6. Anava One Line Pretest Test Results

Sample	N	F_{count}	F_{tabel}
Experimental Class I	31	0,165	3,10
Experimental Class II	30	0,165	3,10
Control Classes	30	0,165	3,10

H_0 is approved since $F_{\text{count}} < F_{\text{table}}$ is the outcome of the single-path anava test computation. Therefore, on average, the three sample groups will be given the same treatment. Therefore, it can be said that before getting the treatment of creative thinking, students are balanced.

2. Hypothesis Test

a. Normality Test

The following are the findings of the normalcy computation using the Liliefors test at the 5% significance level.

Table 7. Posttest Data Normality Test Results

Sample	N	L_{max}	L_{table}
Experimental Class I	31	0,1434	0,1591
Experimental Class II	30	0,0879	0,1610
Control Classes	30	0,0967	0,1610

According to the Liliefors normalcy test calculation findings, $L_{\text{max}} < L_{\text{table}}$, up to H_0 Accepted. As a result, the sample groups were drawn from a population that was normally distributed.

b. Homogeneity Test

Here are the findings of the homogeneity test computation at the 5% significance level using the Bartlett test.

Table 8. Posttest Homogeneity Test Results

Sample	Variance	B_{count}	B_{table}
Experimental Class I	339,24	0,9479	0,9331
Experimental Class II	378,67	0,9479	0,9331
Control Classes	173,97	0,9479	0,9331

Result account Homogeneity test using the Bartlett test shows $B_{count} > B_{table}$, up to H_0 Accepted. Thus, all sample groups came from homogeneous variance populations.

c. Anava Test

The results of the anava test of one cell line are not the same as the significance level of 5% are as follows.

Table 9. Anava Test Results One Line Posttest

Sample	N	F_{count}	F_{tabel}
Experimental Class I	31	16,45	3,10
Experimental Class II	30	16,45	3,10
Control Classes	30	16,45	3,10

H_0 is rejected because the results of the one-path anava calculation show $F_{count} < F_{table}$. The three models presented are Inquiry-Flipped Classroom with the help of Edpuzzle, Inquiry-Flipped Classroom, and the direct learning model have different abilities for students' creative thinking skills.

A post-anava test or scheffe test will be conducted to find out which model is better between the Inquiry-Flipped Classroom learning model assisted by Edpuzzle, Inquiry-Flipped Classrom and the direct learning model.

d. Anava Post Test

The following are the outcomes of calculating the post-anava test using the Scheffe test.

Table 10. Post-Anava Results One Cell Path Not the Same Posttest

Comparison	Computing		
		238,0849	628,0036
	0,0655	0,0655	0,6666
RKG	297,79	297,79	297,79
	12,1892	32,1518	5,1902
	6,2	6,2	6,2
Decision	H_0 rejected	H_0 rejected	H_0 accepted

After utilizing the Scheffe test in the post-anava test, the comparison computation μ_A & μ_B revealed that $F_{\text{count}} = 12.1892 > 6.2 = F_{\text{table}}$, leading to the rejection of H_0 . So, the Edpuzzle-assisted Inquiry-Flipped Classroom model is different in quality from the Inquiry-Flipped Classroom model. Because the average learning model of Inquiry-Flipped Classroom assisted by Edpuzzle is larger than the Inquiry-Flipped Classroom model, the Inquiry-Flipped Classroom model assisted by Edpuzzle is better than the Inquiry-Flipped Classroom on students' creative thinking skills.

Moreover, $F_{\text{count}} = 32.1518 > 6.2 = F_{\text{table}}$ was shown by the post-anava test findings using the Scheffe test in the comparison computation μ_A & μ_C , leading to the rejection of H_0 . So, the Edpuzzle-assisted Inquiry-Flipped Classroom Model is different in quality from the direct learning model. In terms of students' capacity for creative thought, the Inquiry-Flipped Classroom model with Edpuzzle's assistance is superior to the direct learning model since its average learning is higher than that of the latter.

$F_{\text{count}} = 5.1902 < 6.2 = F_{\text{table}}$ is the outcome of the post-anava test using the Scheffe test in the comparison computation μ_B & μ_C . Therefore, the quality of the inquiry-flipped classroom model is equivalent to that of the direct learning approach. The Inquiry-Flipped Classroom model outperforms the direct learning approach in terms of students' capacity for creative thought since its average size is bigger than that of the latter.

3. Observation Sheet Analysis

a. Teacher Observation Sheet

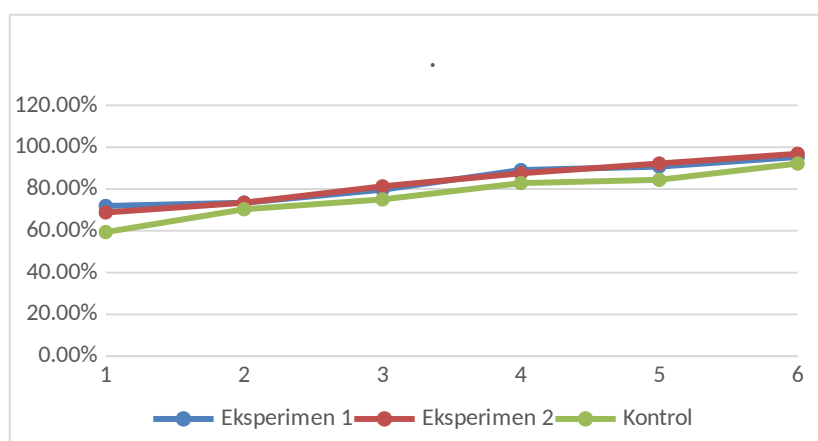
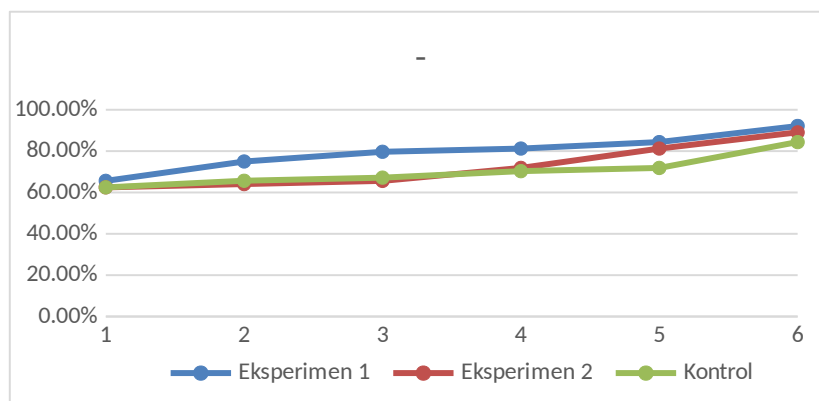


Figure 3. Teacher Activity Assessment Graph

Based on the figure above, it can be seen that there is an improvement in the quality of teacher activities in using the Inquiry-Flipped Classroom model assisted by Edpuzzle, the Inquiry-Flipped Classroom and the direct learning model has improved. Thus, it can be concluded that researchers can improve the shortcomings in each meeting.

b. Student Observation Sheet

**Figure 4. Student Activity Assessment Graph**

Based on the image above, it can be seen that there is an improvement in the quality of student activities in using the Edpuzzle-assisted Inquiry-Flipped Classroom model, the Inquiry-Flipped Classroom and the direct learning model has improved. So, it can be concluded that student activities are getting better at each meeting.

The findings of the hypothesis test, which employed the Anava test of a single alternative cell path, demonstrated that students' capacities for applying the Edpuzzle-assisted Inquiry-Flipped Classroom model, the Inquiry-Flipped Classroom model, and direct learning varied. This is because the Inquiry-Flipped Classroom model assisted by Edpuzzle allows students to create new ideas in solving problems assisted by Edpuzzle which presents videos and quizzes as feedback to understand the concept well in developing various answer ideas for Quadrilateral Flat Building material through quizzes and learning videos listed on Edpuzzle. In contrast to the Inquiry-Flipped Classroom model without the help of Edpuzzle, students are directed to develop ideas without the help of videos and quizzes as feedback that can build the development of students' ideas in solving problem problems as stated in Edpuzzle. Meanwhile, in the direct learning model, there is no feedback that directs students in developing problem-solving ideas as stated in Edpuzzle.

Since there was an average difference in each sample group, the test continued with a post-anava test using the scheffe test. This test was carried out to determine which learning model has the greatest impact on students' creative abilities. among the hands-on learning paradigm, the Inquiry-Flipped Classroom approach, and the Edpuzzle-assisted Inquiry-Flipped Classroom model. The post-anava test was analyzed using the Scheffe test, and the following are the findings.

1. Edpuzzle-assisted Inquiry-Flipped Classroom model with Inquiry-Flipped Classroom model model

Research has demonstrated that students who got the Inquiry-Flipped Classroom model treatment with Edpuzzle had higher levels of creative thinking than those of students who did not get this model.

This is because Edpuzzle supports the Inquiry-Flipped Classroom model's learning process. first students are given an initial stimulus as a stimulus before a face-to-face meeting in class in the form of a learning video with a quiz inserted as feedback. Then students take note of important things and questions that will be asked later in class. So, students can play an active role in the learning process in the classroom. Additionally, the goal of the student-teacher conference is to develop challenges, discover solutions, and be able to consolidate results with the help of Edpuzzle media. In addition, the learning that takes place is not only centered on the teacher, and does not focus on only one direction.

As for the model Inquiry-Flipped Classroom The implementation of learning is the same as that carried out in the Inquiry-Flipped Classroom Assisted Edpuzzle. However, in this model there are no auxiliary media such as videos and quiz as feedback for students to understand concepts well in developing various answer ideas. These differences turned out to have a different impact on students' creative thinking skills. according to the statement (Wiyani & Fajrie, 2024) Media is necessary to support the development of pupils' creative thinking.

The findings of the post-anava utilizing Scheffe study support this claim by demonstrating that the Inquiry-Flipped Classroom model with Edpuzzle assistance performs better than the Inquiry-Flipped Classroom model.

2. Edpuzzle-assisted Inquiry-Flipped Classroom model with hands-on learning model

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Students who used Edpuzzle to support the Inquiry-Flipped Classroom model demonstrated higher levels of creative thinking than those who received instruction via the direct learning paradigm. This is due to the learning process of the Inquiry-Flipped Classroom model assisted by Edpuzzle, first students are given an initial stimulus as a stimulus before a face-to-face meeting in class in the form of a learning video with a quiz inserted as feedback. Then students take note of important things and questions that will be asked later in class. So, students can play an active role in the learning process in the classroom. Consequently, pupils are able to actively participate in their education. Furthermore, the meeting in the classroom of students is directed to formulate problems, find out answers, and be able to compile findings assisted by Edpuzzle media. In addition, the learning that takes place is not only centered on the teacher, and does not focus on only one direction.

As for the direct learning model, students are required to listen to explanations from the teacher who then at the next stage students do practice questions independently. In the implementation of the direct learning model, it is more focused on teachers who are more active than students, in contrast to those applied in experimental classes, students are required to be more active than teachers. This causes students not to play an active role in learning which results in students' creative thinking skills. This is in line with (Fajrilia et al., 2019), that high-level abilities can be formed when the learning process takes place and the learning is student-centered. One of the components of high-level thinking ability is creative thinking.

The findings of the post-anava exam utilizing the Scheffe demonstrate that, in comparison to the direct learning model, the Inquiry-Flipped Classroom Assisted Edpuzzle model has a greater effect on students' creative thinking abilities.

3. Inquiry-Flipped Classroom Model with hands-on learning model

It has been demonstrated that students who used the inquiry-flipped classroom approach had higher levels of creative thinking than those who used the direct learning style. This is due to the learning process of the Inquiry-Flipped Classroom model, first students are given an initial stimulus as a stimulus before a face-to-face meeting in class in the form of material and LKPD as feedback. Then students take note of important things and questions that will be asked later in class. So, students can play an active role

in the learning process in the classroom. Furthermore, the meeting in the classroom of students is directed to formulate problems, find out answers, and be able to compile findings. In addition, the learning that takes place is not only centered on the teacher, and does not focus on only one direction.

As for the direct learning model, students are required to listen to explanations from the teacher who then at the next stage students do practice questions independently. When the direct learning model is used, it is more focused on teachers who are more active than students, in contrast to those applied in experimental classes, students are required to be more active than teachers. Students become less engaged in their education as a result, which develops their capacity for original thought. This corresponds with (Fajrilia et al., 2019), that learning occurs and student-centered instruction can result in the formation of high-level talents. Creativity is one of the elements of higher-level cognitive abilities. According to the findings of the post-anava exam utilizing the Scheffe test, which demonstrate that the inquiry-flipped classroom approach has a greater influence on students' ability for creative thought than the direct learning model

CONCLUSIONS

We may conclude that the study and discussion results demonstrate that students who get the Edpuzzle-facilitated Inquiry-Flipped Classroom learning model outperform both the direct learning model and the Inquiry-Flipped Classroom model. Students who were taught using the Inquiry-Flipped Classroom style with support from Edpuzzle also showed improvements in their creative thinking abilities.

That being said, it is anticipated that one of the approaches to teaching mathematics in schools will be the Edpuzzle-assisted Inquiry-Flipped Classroom model. This model supports creative creative thinking with the help of Edpuzzle media, which makes learning more engaging.

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