

# Improving Student's Critical Thinking Skills Through the Implementation of Thinking Squares Media

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**ABSTRACT.** The objective of this study is to prove the effectiveness of using Thinking Squares media in improving students' critical thinking skills in elementary schools. This study was a quasi-experimental study with a pretest-posttest group design. The population in this study were all fourth-grade students of Elementary School in Gedong Songo, Sumowono District Cluster. The sampling technique used in this study was a combination of area and purposive sampling. Data collection techniques used tests, observation, questionnaires, and documentation. The data analysis technique used regression test, t-test, and paired sample t-test. The results show that: (1) There is an effect of using thinking squares media on students' critical thinking skills. The regression test results show a significance level of  $> 0.05$ , it is  $0.077 > 0.05$ , therefore,  $H_a$  is accepted; (2) There are differences in students' critical thinking skills. The t-test results show that the average score of the experimental class 2 is higher than the experimental class 1 ( $81.808 > 77.231$ ), and the significance level is  $< 0.05$ , it is  $0.00 < 0.05$ , therefore,  $H_a$  was accepted; (3) The thinking squares media is effective in improving students' critical thinking skills. The results of the paired sample t-test showed that the significance level of the experimental class 1 is 0.048, and the significance level of the experimental class 2 is 0.023. Both  $< 0.05$ , therefore,  $H_0$  is rejected and  $H_a$  is accepted. Hence, it can be concluded that the use of Thinking Squares media can improve students' critical thinking skills in Elementary Schools. Thinking Squares media is an innovative medium so that the student learning experience increases and students are actively involved in learning.

**Keywords:** Critical Thinking Skills; Media Thinking Squares.

## 1. INTRODUCTION

Education is an attempt to draw out the potential that students have, instead of introducing ideas to students so that they know various things [1]. In the thematic learning observed by researchers, students have not been fully involved in learning. This involvement also includes thinking activities. Students have not developed their thinking activities. Moreover, the evaluation questions given by the teacher at the end of the lesson are still around the cognitive aspects of knowing and understanding, it has not reached higher-order thinking skills which include cognitive aspects of C4 (analysis), C5 (evaluation), and C6 (creation).

The fourth-grade thematic learning in the second semester has the theme The Richness of my Country, in energy material. According to the teacher, the students still have difficulty explaining how to save energy. Other difficulties experienced by students are expressing new ideas on how to

save energy, alternative energy, and use energy for environmentally friendly technology. This is due to the absence of other media besides student books that can stimulate students to come up with ideas about how to save energy, alternative energy, and energy for environmentally friendly technology.

One of the higher-order thinking skills that can be developed in elementary school is critical thinking skills [2]. One of the indicators of critical thinking according to Edward Glasser is the recognition of the problem [3]. To introduce the problem, one of the supporting learning scenarios is problem-based learning. The stages in the problem-based learning scenario are: first, students will be oriented to a problem regarding how to save energy, the limitations of energy, and environmental problems caused by the use of energy for technology that is not environmentally friendly. Second, students are organized by the teacher to solve these problems. Third, students

collect information, explain and find solutions. Fourth, students prepare worksheets. In the last stage, the teacher helps students reflect and evaluate the processes students use during learning.

In the third stage in problem-based learning, the information gathering stage, the teacher must provide learning resources that can stimulate students to find their ideas. By discovering their knowledge, learning will be more meaningful and memorable for students. Problem-based learning will attract students more if it is packaged in the form of a game.

In this research, the researcher reviews the theme of Richness of My Country, energy materials by using the media of thinking squares. The reason for using discovery-oriented thinking squares media is that this media stimulates students' critical thinking activities including observing images of objects, identifying object characteristics, making hypotheses, collecting object data, and making conclusions. Moreover, this media also encourage students to be active in learning through games provided through thinking squares media. This media is in the form of applications such as the game of snakes and ladders, which contain boxes with pictures of objects, dice, pawns, and object cards. This media is useful for stimulating students to find solutions to problems related to energy. Students have the task of combining two pictures, then observe them. Students solve the problem with the two pictures, then write them down. Based on the observations of researchers at State Elementary School of Sumowono District and the advantages of thinking squares media, it is necessary to study the effectiveness of discovery-oriented thinking squares media on students' critical thinking skills.

**2. RESEARCH METHOD**

This study was a quasi-experimental study with a pretest-posttest group design. The design of this study consisted of two groups consisting of a group that was given learning treatment with thinking squares media called the experimental group I and a group with animated PowerPoint media learning called the experimental group II. The population in this study were all students of grade IV of Elementary School in Gedongsongo Cluster, Sumowono District, Semarang Regency, in the academic year of 2020/2021, there were 128 students. The sampling technique used in this study was a combination of area and purposive sampling. The considerations used in the area and purposive sampling including regional similarity, school accreditation, curriculum, and basic knowledge of students. The research sample was the fourth-grade students of State Elementary School Jubelan 01 and State Elementary School Jubelan 02, with 26

students in each of the schools. Data collection techniques were tests, observation, questionnaires, and documentation. The data analysis technique used after the analysis prerequisite test was the regression test, t-test, and paired sample t-test.

**3. RESULT AND DISCUSSION**

The results on critical thinking skills are obtained from the pre-test and post-test. In brief, the score of critical thinking skills is presented in Table I.

**TABLE 1.** Results of pretest and posttest critical thinking skills

Data	Class	Lowest Score	Highest Score	Average	Category
Pre-test	Experiment 1	31	77	51.96	Sufficient
	Experiment 2	34	77	49.00	Sufficient
Post-test	Experiment 1	67	93	81.81	Good
	Experiment 2	64	93	77.23	Good

Table I shows that the average of students' initial critical thinking skills in experimental class 1 is 51.96 while experimental class 2 is 49.00. Both are in a good category. After the learning process, the average critical thinking skills of students in experimental class 1 increased to 81.81 which was included in the good category, while experimental class 2 increased to 77.23 in the good category. The average of students' critical thinking skills in experimental class 1 is higher than in experimental class 2, both pretest and posttest.

**3.1 The Effect of Using Thinking Squares Media towards Students' Critical Thinking Skills**

To determine the effect of using mind mapping towards student motivation and creativity, a regression test is needed. The results of the simple linear regression test are shown in table 2 below.

**TABLE 2.** Regression test results

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	70.155	6.476		10.834	.000
	X	.224	.121	.353	1.849	.077

a. Dependent Variable: Y

Table II shows the significance level > 0.05, it is 0.077 > 0.05, therefore, Ha is accepted. Hence, it can be concluded that there is an effect of X on Y.

Thus, it can be concluded that the use of thinking squares media affects students' critical thinking skills.

### **3.2 The Differences in the Use of Thinking Squares Media towards Students' Critical Thinking Skills**

To find out the difference in the use of thinking squares media towards students' critical thinking skills, it is necessary to do a t-test. The summary results of the t-test are shown in table 3 below.

**TABLE 3.** Summary of t-test results

Class	t	d	sig	mean	lower	upper
Experiment 1	52.20	2	.00	81.80	78.5	85.0
	7	5	0	8	8	3
Experiment 2	49.18	2	.00	77.23	74.0	80.4
	5	5	0	1	0	6

Table III shows that the average score of experimental class 2 is higher than experimental class 1 (81.808 > 77.231). Hence, the treatment in experimental class 2 is more effective than the experimental class 1. The significance level is <0.05, it is 0.00 < 0.05, then  $H_a$  is accepted. So, it can be concluded that there are differences in learning using thinking squares media.

### **3.3 The Effectiveness of Thinking Squares Media in Improving Students' Critical Thinking Skills**

To find out the effectiveness of using thinking squares media in improving students' critical thinking skills, it can be conducted by using paired sample t-test. The results of the paired sample t-test are in table 4 below.

**TABLE 4.** Summary of paired sample t-test

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	E1_PRE & E1_POST	26	.392	.048
Pair 2	E2_PRE & E2_POST	26	.445	.023

Based on table IV, the significance level for experimental class 1 is 0.048, and the significance level for experimental class 2 is 0.023. Both < 0.05. Hence,  $H_0$  is rejected and  $H_a$  is accepted. Therefore, there are differences in the results of the pretest and posttest in learning using Thinking Squares media. Thus it can be concluded that the thinking squares media is effective in improving students' critical thinking skills

Based on the research results, it can be concluded that the thinking squares can improve students' critical thinking skills in thematic learning. In the initial data, the average score of

critical thinking skills is in the sufficient category. The average score in the two classes is almost the same because students' critical thinking skills in answering questions have not been developed. After learning, the average score of critical thinking skills in learning using thinking squares media is higher when compared to learning using animated PowerPoint media (Table I).

Learning activities that involve students in direct experience are very effective compared to teacher explanations in the verbal form [4]. Thinking Square media display is classified as providing new experiences for students in learning. Students do not just sit quietly listening to the teacher, but they try to use the media directly. This medium is played in almost the same way as the games of snakes and ladders. The difference is, when each student's piece stops in one of the squares, the student must take a picture card that has the same picture as the place where the pawn stopped. Presentation of material that is fun, joyful, interesting, and easy to understand by students has a positive effect on learning success [5].

Learning media that provoke students to answer simple questions, automatically, it can practice their critical thinking skills [6]. By using two cards in the game of Thinking Square media, students can describe ways to overcome the depletion of energy use, they are (1) describing the idea of creating an energy-saving device and (2) describing the idea of a tool that uses alternative energy. Meanwhile, for the energy problem that is not environmentally friendly, it describes the various students the use of tools with environmentally friendly energy. Thinking Square media is an invention-oriented learning media. Students are required to actively think critically in solving problems.

Critical thinking skills are skills to develop logical reasoning patterns based on argument analysis and the emergence of ideas from each student's interpretation [7]. The idea raised by one of the students in this study is in accordance with Widiana's opinion, that students interpret ideas based on logical reasoning and analytical argumentation. Electrical energy can be saved by not turning on the lights when it is not in use.

Although using Thinking Square Media has its advantages, in practice there are also limitations. The limitation of this media is that it can only be used for one lesson, it is the energy material. Critical thinking is not a teaching material but a process or activity that can be included in a learning material at a certain level of education [8]. Hence, it can improve students' critical thinking skills on various materials. The thinking squares media needs to be further developed. One of them is by creating applications that can be played through

gadgets and can include a variety of learning materials.

#### 4. CONCLUSION

Based on data analysis and discussion, it can be concluded that the thinking squares media is effective in improving students' critical thinking skills. This media can help students interpret ideas based on logical analysis, reasoning, and argumentation. This media provides a new learning experience for students. Moreover, Thinking Square media is presented in the form of attractive images and it is not boring for students. Media thinking squares need to be developed again in the form of digital applications for all learning.

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