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The Application of the RADEC Learning Model to Improve the Creative Thinking Skills of Elementary School Students

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ABSTRACT

Creative thinking is one of the 21st century skills that students need to master in order to be able to face various personal and social problems in their lives. Creative thinking skills can be improved through the RADEC learning model. This study aims to determine the application of the RADEC learning model to improve students' creative thinking skills. The method used is pre-experiment with a one-group pretest-posttest design. The research was conducted on grade V students of SD Negeri Kutabima 04, Cimanggu District, Cilacap Regency. The sample used in the study amounted to 22 students, namely 13 males and 9 females. The instruments used were tests about creative thinking skills and observation sheets. The creative thinking ability test is carried out in two stages, namely the pretest and posttest stages. From the research, it was obtained that the average score of students' creative thinking ability in the pretest was 72 while the average posttest score was 88. The results of the study show that there is a significant difference between pretest and posttest. It can be interpreted that there is an increase in students' creative thinking skills before and after treatment using the RADEC learning model.

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1. INTRODUCTION

The skills required in the 21st century require education to adapt to the times. Advancements in technology, communication, social media, and the internet have fueled the need for individual creativity in various aspects of life. Thus, the ability to think creatively is increasingly important for the world community in facing various global problems (Yuli, 2016). Various global problems that are now emerging are challenges for the world of education in its efforts to form a generation that is intelligent, agile, responsive, and creative (Aljaafil, 2019). Education is a process that is systematically designed with the aim of changing and developing individual behavior according to expectations.

Thus, schools as formal educational institutions play a role as a means to achieve these educational goals (Supardi, 2018). Creative thinking is the ability to find different possibilities in dealing with situations, as well as solve problems with diverse approaches. The more alternatives that can be offered to a problem, the higher the level of one's creativity (Dewi, 2019). In line with the opinion (Haryanti, 2019) That creative thinking is an activity in overcoming problems, the process that goes through includes several stages, ranging from preparation, concentration, mastery of knowledge, problem solving, to verification.

Through these stages, it is hoped that fresh new ideas will emerge. Creative thinking is a high-level thinking skill that is very important in the 21st century. These skills not only contribute to students' learning processes and outcomes, but also train them to face and solve various problems in daily life(Hagi, 2021). A seemingly difficult problem to solve actually has a solution, it's just that we haven't found a solution yet. Therefore, efforts made to find a solution to a problem can be considered as a creative thinking process (Mursidik, 2015).

Teachers as educators and students who interact every day in the classroom are required to create an active, creative, and engaging learning (Aulia, 2023). Teachers are expected to continue to innovate in the use of media, strategies, methods, and learning models to develop students' critical thinking skills. By applying various interesting methods and models, the learning process becomes more exciting and able to meet the diverse learning styles of students, so that they can more easily absorb the material taught (Lestari H. S., 2021). The results of interviews with two teachers at one of the elementary schools in Cimanggu show that students' creative thinking skills are still relatively low.

Therefore, it is important to develop and implement learning methods that emphasize creative thinking skills in elementary school. This aims to make students have flexibility in thinking and are able to solve various problems in today's life in a creative way. In addition, from the results of observations and interviews, it can be seen that teachers are still less focused on developing students' creative thinking skills, especially through classroom learning and creative tasks that can encourage their high-level thinking skills. The learning model needs to provide opportunities for students to develop their knowledge and experience, ranging from basic skills to higher skills, such as creative thinking skills (Mursidik, 2015).

Seeing the existing problems, innovative learning models are needed to develop students' abilities, especially in creative thinking skills. However, in the field, teachers often face difficulties in implementing these models, so the learning process has not undergone many changes (Yulianti, 2022). According to Sopandi, One of the innovative learning models that can be a solution in the implementation of learning is the Read-Answer-Discuss-Explain-and Create (RADEC) model. The RADEC learning model has a number of characteristics that not only support the understanding of concepts, but also develop 21st century skills, including students' creative thinking skills.

These characteristics include: 1. The RADEC learning model is able to motivate students to actively and creatively engage in the learning process, 2. This model also encourages students to learn independently, 3. With RADEC, students can connect the knowledge they already have with the material being studied, 4. This model relates the teaching material to real life, so that students can see its application in their daily lives, 5. Learning that uses the RADEC model focuses on students, creating an active atmosphere where students can ask questions, discuss, propose ideas, and summarize information about the material that has been learned, 6. Before starting a lesson, this model gives students the opportunity to do pre-learning tasks, so they can understand the material more deeply (Sopandi W. , 2019).

Various studies on the application of the RADEC model have been carried out by a number of researchers in the near future. One of the important findings shows that elementary school students' mastery of concepts, particularly on the topic of water cycles and the human respiratory system, has increased significantly after the implementation of the RADEC learning model. The results of research on the RADEC model conducted by several researchers at the elementary school level show that the use of this model can improve students' understanding of concepts related to human respiratory matter (Setiawan, 2020), Improve critical thinking skills in understanding light materials and in the context of Indonesian language (Pratama, 2019), Improve creative thinking skills and high-level thinking in learning about energy (Sopandi W. , 2017) and improve the ability to collaborate and communicate (Sukmawati, 2020).

Several studies that have been conducted show that the RADEC model is very effective in improving concept mastery, creative thinking skills, and the development of collaboration and communication attitudes among students. In this study, the researcher will carry out learning in class V, especially in Indonesian lessons with a focus on Procedural Text material. Based on the explanation above, the purpose of this study is to find out how the application of the RADEC model can improve students' critical thinking skills in elementary school.

2. RESEARCH METHODS

This study uses a quantitative approach with a pre-experimental method, adopting a pretest-posttest design for one group (Trisliatanto, 2019). This method was applied to collect data on the critical thinking skills of elementary school students, both before and after treatment. The treatment provided in this study refers to the RADEC learning model. The research process began with the implementation of the pretest, continued with learning using the RADEC model, and ended with a posttest. The research design that refers to the posttest of one pretest group can be seen in Table 1.

Table 1. *One Group Pretest Posttest Design*

Pretest	*Treatment*	*Postest*
O_1	X	O_2

Information:
O_1: pretest before treatment
X : treatment using the RADEC learning model
O_2: final test (posttest) after treatment

This research was carried out at SD Negeri Kutabima 04, Cimanggu District, Cilacap Regency, in the odd semester of the 2024/2025 school year. The study participants consisted of 22 students who taught in class V, with details of 13 males and 9 females. To collect data, testing and observation techniques are used. The instruments applied include thinking ability tests and observation sheets in the implementation of the RADEC model.

Critical thinking ability tests were given before and after the research, while observation sheets related to the application of the RADEC model were used after the implementation of learning. In this observation, students observe the teacher's activities and ensure that each stage of the planned RADEC model can be implemented properly during the teaching and learning process. The test used in this study is an objective test consisting of multiple choice with four alternative answers. The assessment of this instrument applies a scale in which the correct answer gets a value of 1, while the wrong answer is worth 0.

The observation sheet was used to assess the implementation of learning with the RADEC model through a list that had two choices, namely 1 = yes and 0 = no. For data analysis, a descriptive statistical method is used Technical Data analysis is used, namely descriptive statistical analysis and parametric statistical analysis consisting of classical assumption tests (normality tests) and hypothesis tests (t-tests).

3. RESULTS AND DISCUSSIONS

Indicators of critical thinking ability in this study use theory according to Ennis in (Lestari H. &., 2021), including: 1) providing simple explanations (elementary clarification), 2) building basic skills (basic support), 3) making inferences (inferencing), 4) making further explanations (advanced clarification). Based on the results of the study, the percentage of each indicator of critical thinking ability in the pretest is presented in the following figure:

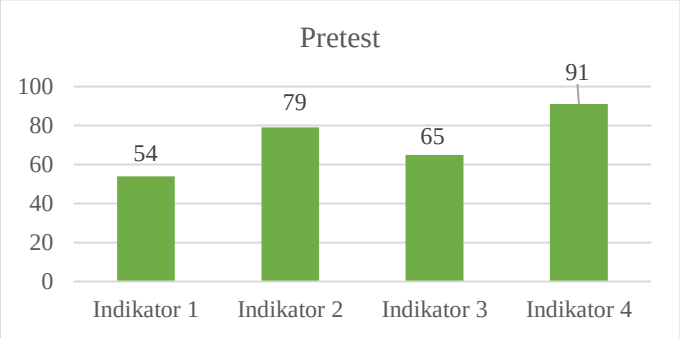

Figure 1. Bar graph of the percentage indicator of creative thinking ability in the pretest.

Based on the image above, the achievement percentage for each indicator of creative thinking ability in the pretest is as follows: indicator 1 achieved a score of 54%, indicator 2 achieved 79%, indicator 3 reached 65%, and indicator 4 obtained a score of 91%.

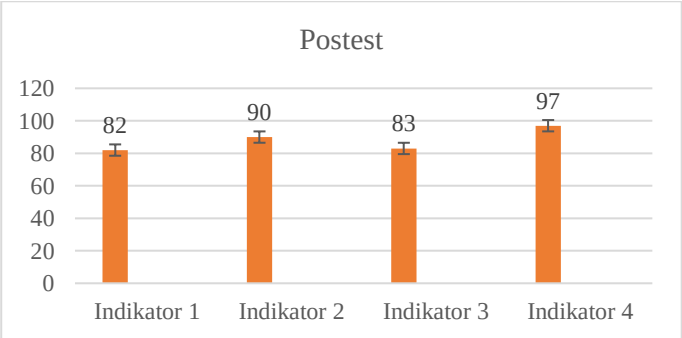

Figure 2. Posttest Creative Thinking Ability Indicator Bar Chart

Figure 2 shows that the percentage of achievement of each indicator of creative thinking ability in the posttest has increased significantly compared to the pretest. In indicator 1, a score of 82% was obtained, while indicator 2 achieved the highest score with 90%. Indicator 3 also showed good results with a score of 83%, and most strikingly, indicator 4 achieved a score of 97%.

The data obtained from the test of students' creative thinking ability consisted of pretest and posttest results obtained through a written test in the form of multiple choice. These questions were given to the respondents and then the data was analyzed. The pretest is carried out on the respondents before the learning process begins because it aims to measure the extent of students' creative thinking ability in answering questions about creative thinking skills related to teaching materials. After the pretest was given, then the respondents received treatment using the Read-Answer-Discuss-Explain-and Create (RADEC) learning model, after the treatment was given in the Indonesian lesson of the Procedural Text material, students were then given posttest questions with the same questions. The results of the pretest and posttest obtained the lowest score (X_{min}), highest score (X_{max}), average score ($X_{average}$) and standard deviation(s) as shown in the following table.

Table 2. Deskripsi Skor *Pretest* dan *Posttest*

Description	Pretest	Posttest
Lowest score	40	64
Highest Score	95	100
Average	72	88
Standard deviation	16.01884666	8.466295584
Number of students	22	22

Based on table 1, the average pretest data obtained the lowest score of 40, the highest score of 95 and the average score of 72. Meanwhile, the posttest data obtained the lowest score of 64, the highest score of 100 and the average score of 88 and the average posttest score was higher than the pretest score. This difference can be interpreted as that the treatment that has been given by the RADEC learning model in the learning process can improve students' critical thinking skills. The difference in pretest and posttest scores of students' critical thinking skills can be seen in the following figure:

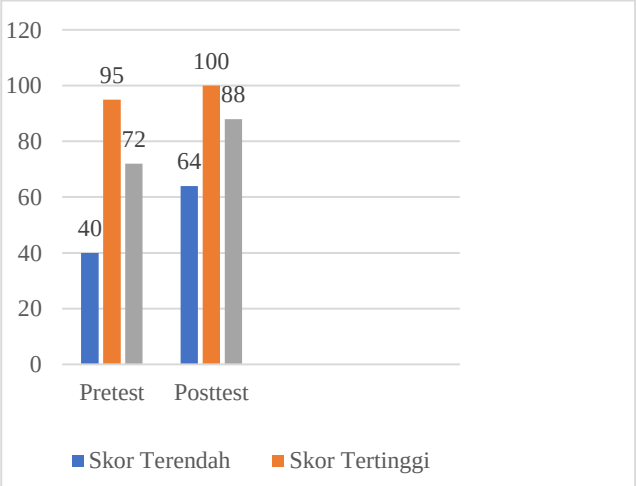

Figure 3. Pretest and Posttest Score Bar Chart of Creative Thinking Ability

Based on the calculation results, it can be concluded that there are differences in students' creative thinking abilities after the RADEC learning model was implemented. This is due to the stage structure in RADEC that stimulates each indicator of students' creative thinking skills. The five stages are explained as follows:

Table 3. N-Gain Test Result

N	Mean Pretest	Mean Posttest	N-gain	Categori
22	72	88	0,5598	Medium

Based on Table 2, it is known that the NGain score classification of the respondents is 0. 5598 and the score falls into the moderate category. Consequently, the implementation of the RADEC (Read-Answer-Discuss-Explain-and Create) learning model is capable of enhancing the critical thinking skills of students in the moderate category. Next, to determine whether the application of the RADEC model significantly affects critical thinking skills, a paired sample t-test was conducted, and the results obtained are as follows:

Table 4. Paired Sample t-test Result

Information	Mean	Std. Deviation	Sig.(2-tailed)	Test Decision
One-Sample Kolmogorov Smirnov				
Postest	88	1,43	0,275	Normal Distribusion
Pretest	72	1,98	0,302	Data
Paired sample t-test				
Pair Pretest				
Posttest	1.360	0,76	0,000	Signifikan

Based on table 3, prior to conducting the paired sample t-test, the data was tested for normality using the One-Sample Kolmogorov Smirnov, and the obtained probability scores for the posttest (0. 275) and pretest (0. 302) were both greater than the significance level of 0. 05. This can be interpreted to mean that both datasets are normally distributed. The data, having been found to be normally distributed, was then further analyzed using the paired sample t-test, resulting in a probability score of 0. 000, which is less than the significance level of 0. 05. Based on these calculations, it can be concluded that there is a difference in students' critical thinking skills after being treated with the RADEC (Read-Answer-Discuss-Explain-and Create) learning model. This is because RADEC features stages that stimulate each indicator of students' critical thinking abilities. The five stages are described as follows:

In the first stage, namely the reading stage, the teacher gives instructions to students to read textbooks and various references according to the concepts that are being studied independently at home. This instruction is given before the learning process begins, usually one week before the material is taught. This reading activity aims to familiarize students and develop their literacy skills. The positive impact of reading activities is that students can build knowledge and understanding independently. That way, when the learning process takes place, students already have a provision of understanding that can be explored more deeply, as well as accustoming them to behave according to the examples contained in the reading text (Siti, 2016).

After the reading activity, the second step is for students to answer pre-learning questions given by the teacher. These pre-learning questions are designed to explore the concepts contained in the reading materials that students have read before. The teacher motivates students to give answers based on the knowledge they have gained from the reading stage. The questions are intended to help students understand the reading and concepts to be studied, so that they can provide a simple explanation of the theme they have read and discussed through their answers.

This simple explanation is an indicator of students' critical thinking skills. At this stage, students also practice building a character of initiative and independence in seeking answers, based on the sources of information they have read (Setiawan, 2020). Furthermore, through these pre-learning questions, teachers have the opportunity to collect and classify the difficulty level of the concept based on the student's answers. In this way, teachers can get a clear picture of the extent of students' knowledge (Lestari H. &., 2021).

The third stage in the learning process is the discussion stage. At this stage, students are invited to discuss to reach an agreement on the answers to the pre-learning questions that have been given by the teacher. Through this discussion, students can find the correct answer together. Teachers divide students into groups of diverse cognitive abilities, including intelligent, active, passive students, as well as those who need more guidance. It is important for teachers to ensure that each student in the group participates in the discussion. This discussion stage not only trains but also develops students' competencies in the realm of knowledge and thinking skills. In addition, this stage stimulates critical thinking skills, which are crucial in forming basic skills and assisting students in drawing conclusions (Sopandi W. , 2019).

The fourth stage in the learning process is the explanation stage. Here, students present their group answers in front of the class, which serves to exercise their creative thinking skills, especially when it comes to further clarification. The teacher takes an active role by encouraging students to ask questions, provide arguments, respond, or add opinions to what other students have said during the presentation. At this stage, the teacher not only functions as a moderator who organizes the group that will make presentations and ask questions to clarify the material, but can also act as a presenter if there are questions from other students that have not been answered.

In addition, teachers provide reinforcement to the concepts of the material being discussed and respond to students' opinions to deepen their understanding. This stage helps students develop communicative thinking skills so that they can convey the results of group discussions well. The activity here also builds students' confidence in presenting the results of the discussion. In the final stage, which is the creation stage, students are encouraged to think creatively and formulate ideas. Activities carried out at this stage include approving ideas, realizing concepts, and reporting the work they have made (Sukardi, 2021).

4. CONCLUSIONS

This study reveals that the application of the RADEC learning model can contribute to improving students' creative thinking skills in Indonesian subjects, especially in Procedural Text materials. However, this study has some limitations, namely focusing on only one type of material and measuring the improvement of students' creative thinking skills. For more in-depth research, it is recommended that the RADEC model oriented towards Education for Sustainable Development (ESD) be applied to other learning materials. In addition, the research can also explore other aspects of thinking, such as creative thinking and problem-solving skills, to provide a more comprehensive picture of the effectiveness of this model in improving students' thinking skills.

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