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Mastery of Concepts and Creativity of Class IV Students on the Mareial of Force Through Learning Radec

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Abstract: This research was conducted to trace the effect of the use of RADEC learning models on mastery of students' concepts and creativity. This is motivated by the low mastery of the concepts and creativity of students who are allegedly due to the inappropriate learning carried out by the teacher. The research method used in this study is pre-experiments with one group pretest-posttest design. Participants in this study were IV grade students consisting of 30 people. Data collection is carried out with a test of mastery of concepts and rubik assessment of student creativity. The results of this study indicate that the use of the RADEC learning model increases the ability to master students concepts significantly and can bring up aspects of students creativity such as compliance with material, creation and innovation, student preparation and how to make their work. Based on the results of the study it can be concluded that the use of the RADEC learning model can overcome the low mastery of students concepts and creativity.

Keywords: RADEC; concept mastery; student creativity

mastery of the concept is the ability of students to understand the meaning of learning and apply it in everyday life (Astuti, 2017). The importance of understanding concepts for students can be seen from the inclusion of understanding concepts in the curriculum at every level of education, besides that, to solve problems a student must know the relevant rules based on the concepts he has acquired. (Widia *et al.*, 2020). Besides that, mastery of the concept, creativity is also needed as part of the results of the learning component. Creativity is the ability possessed by someone to create something better and more useful than before (Merpati, Lonto, and Biringan, 2018). In education, creativity is very important in developing the material that is being studied into something unique and useful (Sari, S and Irdamurni, 2020).

Mastery of concepts and creativity of students is still very poor. Based on the results of the PISA *(Programme for International Student Assessment)* in 2018 Indonesia's position is at the bottom. This is evidenced by Indonesia's PISA score which is 100 points lower than the average of OECD countries *(Organization for Economic Cooperation and Development)*. Indonesia's position at the bottom is thought to be due to the low students' mastery of concepts and creativity. The low mastery of students' concepts and creativity is suspected as a result of the teacher's inaccuracy in carrying out learning.

Learning Science in Elementary Schools (SD) is one of the main lessons that students must learn (Sobron *et al.*, 2019). One of the materials in science learning that are taught in elementary school is force material. Force cannot be seen, but its influence can be felt in the form of a push and pull that is done using force (Handayani, 2017). To gain better mastery of students' concepts and creativity, an appropriate learning model is needed. One of the learning models that can be used is the learning model of *read, answer, discuss, explain, and create* (RADEC).

The RADEC learning model is a learning model that uses its stages as the name of the model itself, namely, Read means reading material, Answer means answering the questions, Discuss means

discussing difficult things, Explain means explaining the material, and Create means creating something from the material (Pratama *et al.*, 2020). The stages in the RADEC model are very easy for the teacher to memorize, so it does not make it difficult for the teacher to achieve the learning objectives (Azis and Asih, 2022). One of the vital parts of this learning model is making learning devices and scenarios (Sopandi *et al.*, 2022). Through the stages in the RADEC learning model, the teacher will provide pre-learning questions that must be done by students before learning begins, with the goal that students can study the material and understand the concept first (Sumirat *et al.*, 2022).

Based on research conducted by (Setiawan, Destrinelli, and Wulandari, 2022) learning using the RADEC learning model can improve students' critical thinking skills because learning with the RADEC model has stages in which there are indicators of critical thinking. Research conducted by (Pohan, Abidin, and Sastromiharjo, 2020) showed that the RADEC learning model can be used as a solution to students' problems regarding the low level of student reading literacy, through the syntax Read the RADEC learning model supports students' reading comprehension activities. Then, based on research conducted by (Setiawan, Sopandi, and Hartati, 2019) The results showed that student's ability to write explanatory texts and mastery of concepts increased significantly after being given learning using the RADEC model.

METHODS

This study was designed using an experimental method with a pre-experimental design involving only one class as the experimental class without a control class (Hamsir, 2017). The pre-experimental design used in this study was a one-group pretest-posttest design. In this design, the pretest was used before being given treatment. Thus the results after treatment will be more accurate because it compares to the conditions before being given treatment and after being given treatment (Hardianto and Baharuddin, 2019).

The number of participants in this study was 30 grade IV elementary school students in the even semester of the 2022/2023 school year. The instruments used in this study were tests and assessment rubrics. The test instrument was used to measure students' conceptual understanding of the style material, while the assessment rubric was used to measure students' creativity in the style material.

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RESULTS AND DISCUSSION

The results of this study are presented in the form of quantitative data assisted by the SPSS version 25.0 for Windows. The research data is in the form of a concept mastery test in the form of a pretest and posttest, then student creativity data is in the form of an assessment rubric.

Concept Mastery

The student's concept mastery data was collected through a concept mastery test in the form of a description that totaled the number of items. The level of cognitive concepts measured on the concept mastery test includes the ability to understand (C2) and analyze (C4). The implementation of data collection on concept mastery begins with a pretest to measure students' initial abilities. Then, given treatment by applying the RADEC learning model for three meetings. Implementation of the RADEC learning model at the first meeting by providing reading material as the first step in the RADEC learning model, namely reading. At the same time, pre-learning questions were given that students had to work on at home independently as the next step, namely answering. Furthermore, in the second meeting, the third step was carried out, namely discussing means that discussing which was carried out individually by students in groups and followed by the fourth step, namely explaining. It means explaining what

was carried out by one of the group representatives. At the third meeting, the final step was carried out, namely creating or making works related to muscle force material. After being given treatment, then a posttest was carried out to measure the final ability of students after being given treatment. The results of the recapitulation of scoring the mastery of all students' concepts are presented in Table 1.

Table 1. Score mastery of the concept test

Test	Lowest score	Highest score	Average score	Elementary school
Pretest	0	61.5	35.137	15.3057
Posttest	15.4	92.3	64.077	16.6918

The results of the scoring recapitulation in Table 1. show that the lowest scores and highest scores from the pretest to posttest obtained by students get increased, so in the learning process using the RADEC model students have increased their mastery of the concept of style material. Then, a normality test was carried out to find out whether the data distribution was normal or not (Amaliah, 2017). A normality test is carried out to determine the next test to be executed in the form of a parametric or non-parametric test. The hypothesis being tested is H0: the data is normally distributed, and H1: the data is not normally distributed. The basis for making a decision for the normality test is to accept H0 if the Sig. > 0.05 then the data is normally distributed, and reject H0 if the Sig. < 0.05 the data is not normally distributed. Table 2 is the results of the normality test from the pretest and post-test.

Table 2. Normality test

	Statistic	df	Sig.
Pretest	0.892	30	0.005
Posttest	0.890	30	0.005

From the results of the data analysis, the value of Sig. equal to 0.005 for the pretest and posttest, this value is less than 0.05, which means that HO is rejected and H1 is accepted. It can be concluded that the data from the pretest and posttest mastery of the concept are not normally distributed. Once it is known that the data is not normally distributed, then further tests can be carried out non-parametrically. Non-parametric is used because it does not require the form of data to be normally distributed (Jamco and A. M. Balami, 2022).

To find out the differences in students' mastery of concepts before and after being given treatment in the form of using the RADEC learning model can be done using the Wilcoxon test. The Wilcoxon test is a test used to test differences between paired data, test comparisons between observations before and after being given treatment, and find out the effectiveness of a treatment (Windi, Taufiq, and Muhammad, 2021). The hypotheses tested were H0: there was a significant difference in the students' mastery of the concepts, and H1: there was no significant difference in the students' mastery of the concepts. Wilcoxon test guidelines accept H0 if the Sig. (2-tailed) < 0.05, and reject H0 if the Sig. (2-tailed) > 0.05. Following are the results of the Wilcoxon test presented in Table 3.

Table 3. *Wilcoxon* test

	***Pretest-Posttest* Penguasaan Konsep**
Z	-4.790
Asymp. Sig (2-tailed)	0.000

Based on the Wilcoxon test results, the Sig. of 0.000 value is less than 0.05, which means that H0 is accepted and H1 is rejected. From the results obtained it was concluded that there were significant differences in the results of student's mastery of concepts before and after being given treatment in the form of using the RADEC learning model. This conclusion is still related to the results by that the suitability of the RADEC learning model is to be able to improve the quality of learning processes and outcomes in situations and conditions in Indonesia(Sopandi, Pratama and Handayani, 2019) bahwa kesesuaian model pembelajaran RADEC untuk dapat meningkatkan kualitas proses dan hasil pembelajaran dalam situasi dan kondisi di Indonesia.

Student creativity

Data on student creativity is obtained from the process of students conducting learning using the RADEC model. The creative process carried out by students while studying science subjects on force material in class IV is by making works using muscle styles which are carried out in groups. The following is the recapitulation of the results of the assessment of student creativity in Table 4.

Table 4. The Assessment of Student Creativity Test

Creativity aspects	Min	Max	Average	Elementary school
Compatibility With Material	100	100	100	0.000
Creation and Innovation	33.3	100	87.787	18.5267
Preparation of Work	33.3	100	83.330	27.3441
Instructions	66.7	100	85.540	16.8970

The results of the recapitulation of scoring students' creativity tests in Table 4. show that the creativity process carried out by the average student as a whole has scores that are not much different in all its aspects. However, in general, it can be seen that the ability of students in the preparation aspect is still low compared to other aspects of creativity.

Table 5. Interpretation of Student Creativity Process

No.	Interpretation	Achievement	Number of students	Percentages
1.	Sangat Kreatif	>85%	20	66.7%
2.	Kreatif	76-85%	4	13.3%
3.	Cukup Kreatif	60-75%	5	16.7%
4.	Kurang Kreatif	55-59%	1	3.3%
5.	Sangat Kurang Kreatif	<54%	0	0

The results of the recapitulation and interpretation of students' creative processes are in Table 5. show that 66.7% of students are very creative, 13.3% of students are creative, 16.7% of students are quite creative and 3.3% of students are less creative. In learning style material using the RADEC learning model, students were not found to be very creative. Thus it can be concluded that the use of the RADEC learning model can bring out aspects of student creativity. This is related to the research that has been conducted by (Ma'ruf, Wahyu, and Sopandi, 2020) from the results of his research it was concluded that the colloidal learning design of the RADEC model with the STEM approach based on Google Classroom can increase student creativity, this can be seen from the overall average score for each stage of the RADEC model which is categorized as very appropriate.

CONCLUSION

This research was conducted with the aim of knowing the effect of the RADEC learning model on students' conceptual mastery and creativity. According to PISA, students' ability to master concepts and creativity in Indonesia is relatively low, it was suspected that using inappropriate learning models. Therefore, this study conducted experiments in learning using the RADEC model which is expected to improve the ability to master the concept and bring out students' creativity. This study used a pre-experiment with a one-group pretest-posttest design. The results of the pretest-posttest data are used to measure students' conceptual mastery abilities. Mastery of students' concepts increased after being given treatment using the RADEC learning model. Before being given the treatment, the average score obtained by students was 35.137 in the pretest, whereas after being given the treatment, students' average score increased to 64.077 in the posttest. Based on the increase in student scores, it can be concluded that the use of the RADEC learning model significantly increased students' mastery of concept abilities. The results of student creativity carried out by students while studying using the RADEC learning model, in general, can bring out aspects of student creativity. Thus, from the results of the data that have been

obtained, the use of the RADEC learning model answers the problem of the low mastery of concepts and creativity of students in Indonesia.

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