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Stacking Analysis of Higher Thinking Skills of Class V Elementary School Students on the Material of Movement Organs Using the RADEC Model

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Abstract: This study aims to analyze the role of implementing RADEC (Read, Answer, Discuss, Explain, and Create) learning in schools on students' higher-order thinking skills in the material of locomotion using the Rasch model analysis. This descriptive research is a quantitative study with a sample of 29 students in early 2023. Data was obtained from the Pretest and Posttest; then, the data was analyzed using the Rasch Stacking Analysis model. The results showed that students with low and high abilities experienced changes in their ability to think at a higher level for the better with the application of the RADEC learning model (Read, Answer, Discuss, Explain, and Create). The RADEC model (Read, Answer, Discuss, Explain, and Create) trains students for independent and group learning. Starting from reading to the last stage, namely making free work through problem-solving activities carried out so that students are trained in high-order thinking skills. After participating in learning using the RADEC learning model, students with high-level thinking skills have increased to a very good category of 55%, good by 34%, and enough by 11%. This increase can be measured from the pretest and posttest logit values. Applying the RADEC learning model to students' higher-order thinking skills shows that students experience improvement, as seen from the results of the pretest and posttest, which are processed using the Rasch stacking analysis model. Students are trained in high-order thinking skills students with high level.

Keywords: Higher Order Thinking, Organs of Motion, RADEC, Stacking

Introduction

Movement organs are material that is considered to have abstract concepts for students. From the facts found in the field, students' Higher Level Thinking abilities are very low, especially for elementary school students. Teachers need to be more accurate about innovative learning models so they only feel they are carrying out innovative learning when they are not (Tulljanah & Amini, 2021). In addition to syntax that is challenging to remember, innovative learning models also require quite a lot of time to learn. As a result of

teachers' propensity to employ the practical and quick lecture technique more often, class activities are often dominated by homework and memorization, which shows that students' thinking abilities aren't used much during instruction. Using a learning model whose syntax is simple to memorize, such as the RADEC learning model (Read, Answer, Discuss, Explain, and Create), which was first introduced by Sopandi, are alternative solutions in other learning models that are more concise in describing all innovative learning models (Tulljanah & Amin, 2021). The Read, Answer,

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Discuss, Explain, and Create (RADEC) learning model (Read, Answer, Discuss, Explain, and Create) consists stages that correspond to the model's name: read, answer, discuss, explain, and create. The Read, Answer, Discuss, Explain, and Create (RADEC) development paradigm was created to address the issue of the poor quality of student learning processes and outcomes in improving students' high-order thinking skills (Tulljanah & Amini, 2021). Higher order thinking skills are crucial for kids to have in the 21st century, where they learn more than just how to recall and analyze information but furthermore, namely, to analyze, evaluate, and create) (Tulljanah & Amini, 2021).

Higher Order Thinking is a fairly complex skill that involves logic and reasoning, judgment, analysis, creativity, problem-solving and decision-making. One of the impacts of implementing Higher Order Thinking Ability is to maximize performance and reduce weaknesses. This can be termed students who are trained to think at a higher level which will affect their ability, speed, and efficiency in making a decision (Tulljanah & Amini, 2021). By increasing students' Higher Order Thinking Abilities and describing changes in students' Higher Order Thinking Abilities related to the application of the RADEC learning model as an alternative learning model for Higher-Level Thinking Skills in elementary schools (Handayani et al., 2019). 1) Read, students carry out reading activities the day before learning takes place, or what is commonly called Pre-learning, using flipbooks of movement organ material that researchers have prepared. 2) Answer; students are then able to work on the questions in the pre-learning activities. The goal is to discover the results they read in the flipbook reading activity. This is done to hone students' high-order thinking skills. 3). Discuss; this activity is carried out when learning takes place, and each group discusses the material for the organs of movement. 4) Explain; in this activity, group representatives present the results of the discussion in front of other groups, then they hold discussions and ask questions with other groups about what was being presented. 5) Create; in the last activity, students make free works according to the material being studied, namely the organs of movement according to the wishes of the students. The application of the RADEC learning model (Read, Answer, Discuss, Explain, and Create) supports the growth of students' reading motivation, trains students' reading comprehension, and encourages high-level thinking in students. This study also prepared a companion book to support the learning process, as shown in Figures 1 and 2. This study is concerned with the issue of how the examination of students' high-level thinking abilities relates to the RADEC (Read, Answer,

Discuss, Explain, and Create) learning paradigm. When learning about the motion organs' material?



Figure 1. Pre-Learning Book Cover



Figure 2. Pre-Learning Books

Method

Using a quantitative technique and a descriptive research strategy, this study was undertaken. Prior to and during participation in learning using the RADEC model, data analysis approaches employ the Rasch stacking analysis model to examine the results of higher-order thinking skills. Fifth-graders from one of the East Jakarta schools served as the study's subjects. The Rasch model of 29 students was utilized as the basis for the sampling strategy (Sumintono, 2018). High-level thinking questions about the subject of the organs of motion were employed as the research instrument in this study. Ten multiple-choice questions make up the test. The text of the discourse contained in the items includes vertebrate and invertebrate animal groups, animal locomotion, characteristics of animal locomotion organs, human skeleton, human locomotion, disorders of human organs and disorders of human organs. Four multiple-choice questions are

included in each text. Students should be able to understand the material and its contents based on the prepared text. They are distinguishing the organs of movement in vertebrates and invertebrates, knowing the organs of movement in humans, knowing the characteristics of the organs of movement in animals, and knowing abnormalities in the human locomotion system. The maximum score is 100 and there are ten questions from the current dialogue, each worth 10 points.

Using the Winstep 3.73 program, descriptive and quantitative data analysis are two data analysis methodologies (Palimbong et al., 2019). Student test scores (pre and post-test) before and after the study were used to collect quantitative data. To assess how substantial improvements in higher-order thinking abilities are measured from pretest and posttest scores, the test data were analyzed using the Rasch dichotomous model and stacking approach (Sukmawati & Zulherman, 2023). A method for examining changes at the individual level is stacking analysis (Laliyo, 2021). The stacking approach allows for the execution of analyses across eight steps (Laliyo, 2021). Based on the Rasch model ranking analysis technique, this phase. the following steps: Based on the Rasch model ranking analysis technique, this phase. the following steps: Based on the Rasch model ranking analysis technique, this phase. the following steps:

1. Assessment is completed on student answers and adjusted to the scientific level of higher-order thinking skills so that the data obtained is polytomous;
2. tabulating polytomous data into Excel and generating data independently for the pretest and posttest;
3. converting data using the WINSTEP program 3.73 into interval data with the same measurement scale;
4. Evaluating the validity and dependability of persons and things in order to determine the instrument's efficacy;
5. Create validation criteria based on test system statistics mismatched order;
6. testing the hypothesis by comparing test results from individuals' pretest and posttest;
7. comparing each student's development of higher-order thinking abilities;
8. You're evaluating the improvement in pupils' scientific high-level thinking abilities.

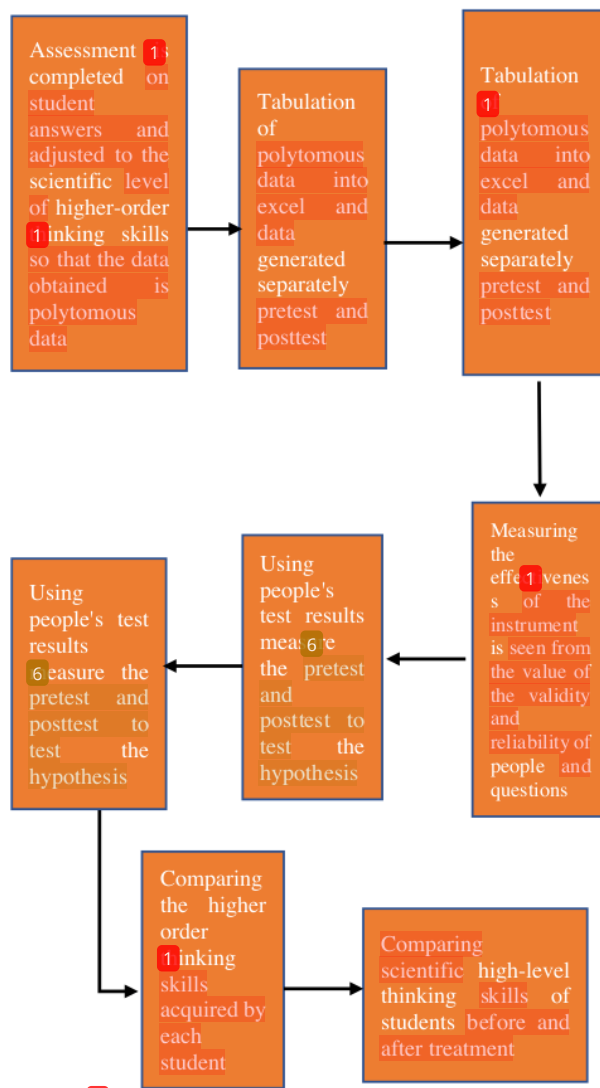


Figure 3. These stages are based on the Rasch model ranking analysis approach

Result and Discussion

the application of the RADEC Learning model (Read, Answer, Discuss, Explain and Create) in students' high-level thinking skills was carried out so that researchers were able to achieve a goal. Students in SD who are using the RADEC Learning Model must take the following actions: (1) Read (2) Respond (3) Talk (4) Describe 5) Produce.



Figure 4. Read - Answer - Discuss - Explain - Create

Results of the kids' pre-test and post-test show how high-order thinking abilities in primary school children have an impact. based on the outcomes of the Pre-Test and Post-Test that students completed and then had the Rasch model applied to them. With a split value of 0.57, the low group of persons has a dependability rating of 0.25. Data demonstrate that students regularly respond to questions, and that all student groups may be measured using sensitive questions of varying quality (Sukmawati, 2022). The value category for the reliability value of extremely good questions is 0.90, and the split value is 2.95. The information demonstrates that the respondents' answers to the questions differed. Table 1 provides more specifics.

Table 1. Person and Reliability Value

PERSON	60 INPUT		60 MEASURED		INFIT		OUTFIT	
	TOTAL	COUNT	MEASURE	REALSE	IMNSQ	ZSTD	OMNSQ	ZSTD
MEAN	7.3	10.0	1.42	1.00	1.02	.1	.91	-.1
S.D.	1.6	.0	1.21	.32	.37	.7	.50	.7
REAL RMSE	1.05	TRUE SD	.60	SEPARATION	.57	PERSON RELIABILITY	.25	

ITEM	10 INPUT		10 MEASURED		INFIT		OUTFIT	
	TOTAL	COUNT	MEASURE	REALSE	IMNSQ	ZSTD	OMNSQ	ZSTD
MEAN	43.6	60.0	.00	.38	1.00	.0	.91	-.1
S.D.	11.0	.0	1.19	.06	.21	1.5	.32	1.4
REAL RMSE	.38	TRUE SD	1.12	SEPARATION	2.95	ITEM RELIABILITY	.90	

With low reliability of people, this can happen because the sample used is small, namely 29 people. However, if you take a look at the item's reliability value, which is excellent, you may be certain that the tool being used can accurately evaluate high-level thinking abilities (Sumintono, 2018). The questions utilized for the pretest and posttest were based on this data. The students' pretest and posttest results were collected, analyzed, and then an array analysis using the Rasch model was carried out. Table 2's variations in logit/measure values may be used to interpret the outcomes of how the RADEC model joint learning affected students' higher-order thinking skills.

Table 2. Changes in the student's measured value from the results of the pretest posttest

Pers on	Pre-Test Logit Value	Post-Test Logit Value	Logit Value Changes	Category
1	0.48	4.49	4.01	Very good
2	0.48	4.49	4.01	Very good
3	0.48	4.49	4.01	Very good

Pers on	Pre-Test Logit Value	Post-Test Logit Value	Logit Value Changes	Category
4	-0.11	4.49	4,6	Very good
5	0.48	4.49	4.01	Very good
6	3.03	4.49	1.46	Enough
7	3.03	4.49	1.46	Enough
8	1.15	4.49	3,34	Good
9	0.48	4.49	4.01	Very good
10	-0.11	4.49	4,6	Very good
11	-0.66	4.49	5,15	Very good
12	1.15	4.49	3,34	Good
13	0.48	4.49	4.01	Very good
14	0.48	4.49	4.01	Very good
15	0.48	3.03	2.55	Good
16	-0.11	3.03	3,14	Good
17	3.03	3.03	0	Enough
18	-0.11	1.15	1.26	Good
19	-0.66	4.49	5,15	Very good
20	0.48	4.49	4.01	Very good
21	1.95	4.49	2.54	Good
22	0.48	4.49	4.01	Very good
23	-0.11	4.49	4,6	Very good
24	1.95	3.03	1.08	Good
25	3.03	4.49	1.46	Good
26	-0.11	3.03	3,14	Good
27	0.48	4.49	4.01	Very good
28	1.15	4.49	3,34	Good
29	-0.66	4.49	5,15	Very good

Mean : 3.36 SD : 0.318

Very Good: 55% Good: 34% Fair: 11%

Table 2's statistics indicate that after engaging in instruction utilizing the RADEC approach, every student saw an improvement in their higher-order thinking abilities. Students' high-level thinking abilities gradually change at all levels—low, medium, and high. Changes in higher-order thinking skills can increase the number of students very well with a total of 16 students (1, 2, 3, 4, 5, 9, 10, 11, 13, 14, 19, 20, 22, 23, 27, 29) , A total of 10 students (8, 12, 15, 16, 18, 21, 24, 25, 26, 28) showed an improvement in high-level thinking skills with strong categories. students who experienced increased high-order thinking skills with sufficient categories occurred in the number of 3 students (6, 7, 17). For more details, can be seen in Figure 5.

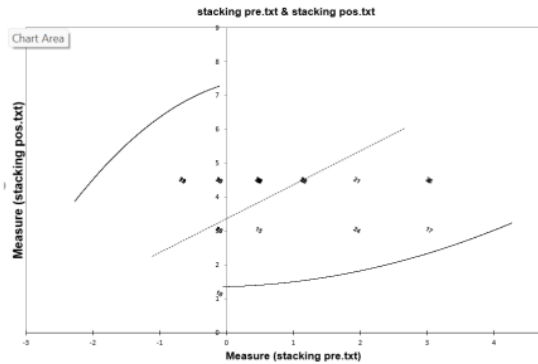


Figure 5. Graph of Changes in Critical Thinking Ability

The use of the RADEC model, which teaches students to use their knowledge to solve problems that exist in the field as well as during the learning process, is responsible for the rise in students' high-order thinking skills. The RADEC model also teaches students to be independent and collaborate so that direct learning is student-centered. The high-order thinking skills of pupils are improved by the RADEC learning paradigm (Pratama et al., 2020).

All students benefit from the RADEC learning approach, while individual students may have gains in the very good, good, or moderate categories. The usage of the RADEC learning model's syntax in accordance with Indonesian students' and learning-related features is what underlies the increase in students' high-level thinking abilities after they have participated in classes using the RADEC model. The first syntax, reading, instructs pupils to study independently so that they are trained to read and develop autonomous conceptual comprehension. In other words, students' higher-level thinking skills improve in direct proportion to the number of reading sources they use (Lestari et al., 2022). Additionally, the teacher assigns pre-learning questions to guide pupils in their reading.

To practice their higher-order thinking abilities, students are given contextualized essays to complete on their own. Identifying materials and their qualities, categorizing materials, examining changes in materials, and knowing how to separate materials are just a few of the questions that are provided to students in line with learning objectives and indicators. Effective learning is the practice of focusing on topics that students do not comprehend by having students complete reading and responding exercises prior to engaging in the learning process (Sopandi, 2019).

Each student is capable of learning in class and prepared for the following phase, which entails discussion and clarifying the steps. During the discussion phase, students participate actively in small groups. Students are forced to share ideas and voice opinions in order to

receive the finest solution that will be given throughout this exercise. To honing their communication abilities, students engage in critical thinking exercises throughout the discussion stage (Handayani et al., 2019). Small-group discussion participation is followed by the explanation phase, which teaches students to use higher-order thinking abilities in response to the outcomes of prior group conversations.



Figure 6. Create free works

After that comes the creativity stage, when students learn how to use their understanding of material concepts to either solve issues or produce works. In order to enhance their understanding, pupils are taught how to produce original ideas, design a piece of art, or offer answers to problems they encounter. The RADEC model requires students to actively and creatively compile or create solutions to existing problems that arise independently using the conceptual knowledge they have, as opposed to other learning models where students concentrate on mastering the material or compiling answers to problems that have been prepared.

Conclusion

Based on the data and debate that have been presented, it can be concluded that students' higher-order thinking skills have improved to a very excellent category of 55%, good by 34%, and enough by 11% after engaging in learning utilizing the RADEC learning paradigm. The difference between the pretest and posttest logit values may be calculated. The measurement value, also known as the logit value, demonstrates how well pupils can respond to questions dependent on how challenging they are. Rasch processing is used to create measuring or logit scores from the students' raw test results. Groups of students with low or high beginning talents experienced this growth. It was also discovered that a large number of students with extremely poor beginning skills later joined learning groups made up of kids who had a rise in the very good category. Using the RADEC

paradigm, the application is carried out while learning, directing students to build students higher-order thinking skills starting from independent study to direct learning following the syntax they go through: the stages of reading, answering, discussing, explaining, and creating.

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