IMPLEMENTATION OF THE RADEC LEARNING MODEL TO IMPROVE HIGH LEVEL THINKING SKILLS IN IPAS COURSES

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Abstract

This research is motivated by the need for a learning model that is able to facilitate students in developing higher-order thinking skills. So the purpose of this study was to describe the RADEC learning model as an alternative learning model that is considered to be able to improve the development of higher order thinking skills of elementary school students in science subjects. This research method used the Single Subject Research method involving 4 fifth grade elementary school students as research subjects. One solution to help develop higher-order thinking skills in this study is to use the RADEC (Read-Answer-Discuss-Explain and Create) learning model. This is evidenced by the very low proportion of overlap in the subject, which is 0% which indicates that the RADEC learning model has a positive effect on students' higher order thinking skills. This increase is assisted by learning syntax which can develop higher order thinking skills. Conclusion So this research is a RADEC learning model capable of helping to improve students' higher order thinking skills.

Keywords: elementary education; higher order thinking skills; RADEC learning model

Abstrak

Penelitian ini dilatarbelakangi oleh kebutuhan akan model pembelajaran yang mampu memfasilitasi siswa dalam mengembangkan keterampilan berpikir tingkat tinggi. Sehingga tujuan dari penelitian ini adalah untuk mendeskripsikan model pembelajaran RADEC sebagai salah satu alternatif model pembelajaran yang dinilai dapat meningkatkan pengembangan keterampilan berpikir tingkat tinggi siswa sekolah dasar pada mata pelajaran IPA. Metode penelitian ini menggunakan metode Single Subject Research yang melibatkan 4 siswa kelas V SD sebagai subjek penelitian. Salah satu solusi untuk membantu mengembangkan keterampilan berpikir tingkat tinggi pada penelitian ini adalah dengan menggunakan model pembelajaran RADEC (Read-Answer-Discuss-Explain and Create). Hal ini dibuktikan dengan proporsi overlap pada subjek yang sangat rendah, yaitu 0% yang mengindikasikan bahwa model pembelajaran RADEC berpengaruh positif terhadap kemampuan berpikir tingkat tinggi siswa. Peningkatan ini dibantu oleh sintaks pembelajaran yang dapat mengembangkan keterampilan berpikir tingkat tinggi. Kesimpulan dari penelitian ini adalah model pembelajaran RADEC mampu membantu meningkatkan keterampilan berpikir tingkat tinggi siswa.

Kata Kunci: keterampilan berpikir tingkat tinggi; model pembelajaran RADEC; pendidikan dasar

Introduction

In the context of the 21st century, HOTS (Higher Order Thinking Skills) or if interpreted in Indonesian the ability to think at a high level, has become an important part of the process of building learning that encourages spiritual attitudes as well as knowledge, social and creativity of students. The role of HOTS is becoming clearer in a changing world, as

reflected in most of the competencies needed in the international world which emphasize critical thinking and problem solving skills in multidimensional and unpredictable situations or commonly called disruption (Lee & Choi, 2017; Singh & Marappan, 2020 ; Cook & Décary, 2020). Therefore, it is important to develop HOTS skills for us to think and reason about answering questions and solving more complex problems (Kwangmuang et al., 2021 ; Lu et al., 2021 ; Fitri, et al., 2018).

However, the reality on the ground still shows that many teachers dominate learning activities using the lecture method. This method certainly will not cultivate students' higher-order thinking skills. This has been proven by research by Saido, et al. (2015) that teachers tend to teach concepts, while problem-based learning, collaborative and inquiry are still not implemented by teachers. The interaction that occurs in class is only carried out in one direction, namely by presenting the material by the teacher interspersed with a number of questions posed to students.

The losses resulting from this lecture activity can result in students who are already fond of reading will fade their hobby. As a result of the teacher's lecturing activities in almost every possible meeting that has caused students to tend to read textbooks just before exams (Sopandi, et al. 2014). Another disadvantage of the tendency of the lecture method is the lack of focus on things that are difficult for students. Students will not know which material is easy and which material is difficult, because students have not studied it independently beforehand. So that students think that all material in learning must be explained by their teacher. Meanwhile, if they try to study independently first, students may be able to master the material without having to be explained by their teacher.

In the end, the dominance of the lecture method in learning will have implications for low higher-order thinking skills. The results of the Program for International Student Assessment (PISA) study prove that high-order thinking skills in Indonesia are still low, the results of the 2018 PISA survey put Indonesia in 74th place, aka sixth from the bottom. Indonesian students' reading ability with a score of 371 is in 74th position, Mathematics ability with 379 is in 73rd position, and Science ability with a score of 396 is in 71st position (Ulkhaq, 2021; Lee, 2020; Ismawati et al., 2023). Thus stating that students in Indonesia still have difficulties in applying and reasoning.

In fact, there have been many studies on solutions to improve higher-order thinking skills, however, these solutions are dominated by "imported" learning from the west. This solution was clearly created not to see the conditions in the Indonesian context. In addition, various learning models from the West are difficult to apply and teachers don't understand the syntax (Sopandi, et al., 2019). So it is clear that a solution (learning model) is needed that is more appropriate to the Indonesian context. In this study, researchers offer the RADEC model as an alternative to developing higher-order thinking skills (Karlina et al., 2020).

Several researchers have conducted research on RADEC learning, such as Lukmannudin (2018) and Pratiwi, et al., (2018) who stated that the results of their research were that the RADEC model could develop students' abilities. Then the results of research Jumanto, et al. (2018) stated that the RADEC learning model can improve learning outcomes. Furthermore, the results of the research by Pratama et al., (2019) and Sukmawati et al., (2020) stated that the RADEC learning model can build critical thinking skills.

However, from some of the research results above, no one has examined the RADEC model implemented in subjects in the Independent Curriculum, namely the Science Subjects. Based on the description above, this study tries to examine the effect of RADEC learning on higher order thinking skills. The research subjects taken were elementary school students in

science lessons. The research took the title "Implementation of the RADEC Learning Model to Improve Higher Order Thinking Skills in Science Subjects".

Research methods

This study uses a quantitative approach. The research method used is an experimental method with a single subject research (SSR) model. This model is an experimental research to look at behavior and evaluate certain interventions or treatments for the behavior of a single subject with repeated assessments at a certain time (Scruggs & Mastropieri, 1998; Kratochwill, 2013; Widodo et al., 2021) . Single subject or commonly known as SSR is a research method that aims to determine whether there is a result of a particular treatment or intervention. Then SSR is a method used to determine the condition of the subject when the condition is not getting treatment (baseline) and the condition of the subject has been treated (intervention), in this case the researcher uses the RADEC learning model as an intervention or treatment.

The design pattern used in this one subject experiment is A-B-A-B. A is the initial state. If no treatment/intervention is given, the baseline is the best estimate. B itself is an intervention condition. The condition of the intervention is the condition in which the intervention is carried out and the target behavior is measured. A' is the second baseline phase observed, and the last is B', namely the intervention phase, which allows conclusions about the relationship between the independent and dependent variables.

The population in this study is all students of class V class 2022/2023 in Nagreg District, Bandung Regency, totaling 32 students. The research sample used was four students. According to the results of interviews with class teachers, the academic abilities of the four students were almost the same. This is in accordance with the experimental typology requirements, namely the data obtained is evenly distributed before being processed.

The instrument of this research was HOTS-based essay questions with material about the properties of sound in class V science subjects. The HOTS questions used relate to the highest level of Bloom's classification, revised by Anderson & Krathwohl (2001): Analyzing (C4), Evaluating (C5)), and Create (C6). The reason for using essay questions in this study is to accommodate students' high-level reasoning abilities.

The final stage of a study is drawing conclusions, before drawing conclusions. Data processing and data analysis are the final stages before researchers draw conclusions from the research conducted. According to Sunanto (2006) "research with Single Subject Research (SSR), namely research with a single subject with research procedures using an experimental design to see the effect of treatment on changes in behavior". The data splitting technique that will be used in this study uses simple descriptive statistics which aim to obtain an overview of the subject's condition after being given treatment or treatment at the intervention stage.

After the data is collected, the data is then analyzed using visual analysis of graphic data, changing the presented data into graphical form, the data is then analyzed in all conditions (A-B-A-B). Graph.ini is used to show changes in each subject's condition within a certain time span. Thus, the analysis used in this research is descriptive analysis which presents data through graphs.

Results and Discussion

Based on the data collected from the research results, then the data is processed and analyzed to find out and describe the development of students' high-order thinking skills using the RADEC learning model in science subjects regarding the properties of sounds in grade V

elementary school. After the subject fills in the questions given, then the results of the answers are given a score according to the scoring criteria that have been included in the scoring guidelines. Then the score obtained by the subject will be converted into a percentage of target behavior. Because in this study will focus on target behavior that involves higher-order thinking skills. The following presents the results of the subject's scoring in carrying out the HOTS test in each phase in the form of a graphical display.

1.   *Baseline*-1 (A1)
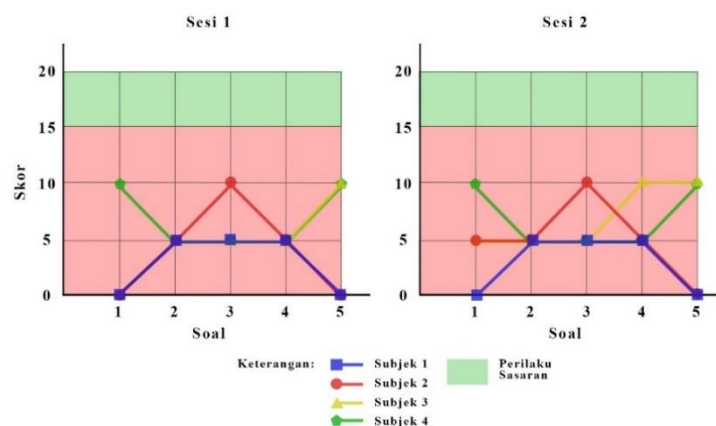
Figure 1. Display of Target Behavior and Scoring Results of Baseline-1 Phase

Referring to Graph 1, the data obtained in the baseline-1 phase can be summarized as follows:

a.   Subject 1 obtained an overall score in session 1 and session 2 both of 15. If accumulated in the form of a percentage of achievement, the results obtained by subject 1 were 15%.

b.   Subject 2 obtained an overall score in session 1 of 20, while in session 2 of 25. If accumulated in the form of a percentage of achievement, the results obtained by subject 2 were 22.5%.

c.   Subject 3 obtained an overall score in session 1 of 25, while in session 2 of 35. If accumulated in the form of a percentage of achievement, the results obtained by subject 3 were 30%.

d.   Subject 4 obtained an overall score in session 1 of 25, while in session 2 of 35. If accumulated in the form of a percentage of achievement, the results obtained by subject 4 were 35%.

2.   Intervensi-1 (B1)
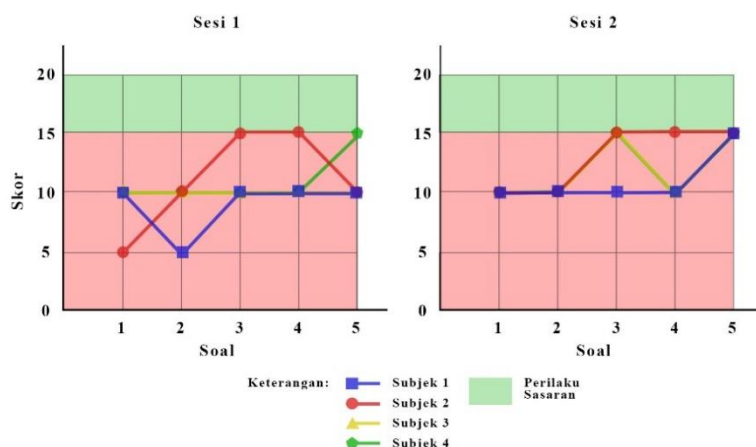
Figure 2. Display of Target Behavior and Intervention Phase-1 Scoring Results

Referring to Graph 2, the data obtained in the intervention phase-1 can be summarized as follows:

a. Subject 1 obtained an overall score in session 1 of 45. Meanwhile in session 2 the score obtained was 55. If accumulated in the form of a percentage of achievement, the results obtained by subject 1 were 50%.

b. Subject 2 obtained an overall score in session 1 of 55, while in session 2 of 65. If accumulated in the form of a percentage of achievement, the results obtained by subject 2 amounted to 60%.

c. Subject 3 obtained an overall score in session 1 of 50, while in session 2 of 60. If accumulated in the form of a percentage of achievement, the results obtained by subject 3 were 55%.

d. Subject 4 obtained an overall score in session 1 of 55, while in session 2 it was 60. If accumulated in the form of a percentage of achievement, the results obtained by subject 4 were 57.5%.
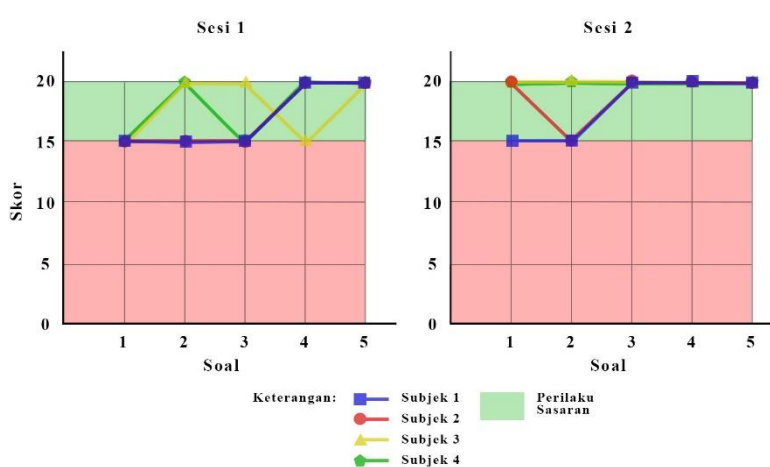
3. *Baseline*-2 (A2)
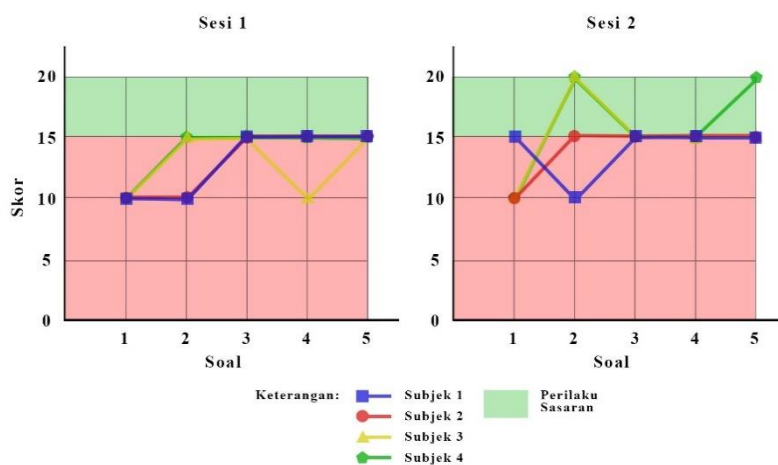
Figure 3. Display of Target Behavior and Scoring Results of Baseline-2 Phase

Referring to 2, the data obtained in the baseline-2 phase can be summarized as follows:

a. Subject 1 obtained an overall score in session 1 of 65. Meanwhile in session 2 the score obtained was 70. If accumulated in the form of a percentage of achievement, the results obtained by subject 1 were 67.5%.

b. Subject 2 obtained an overall score in session 1 of 65, while in session 2 it was 70. If accumulated in the form of a percentage of achievement, the results obtained by subject 2 were 67.5%.

c. Subject 3 obtained an overall score of 65 in the first session, while in the 2nd session it was 75. If accumulated in the form of an achievement percentage, the results obtained by subject 3 were 70%.

d. Subject 4 obtained an overall score in session 1 of 70, while in session 2 of 80. If it is accumulated in the form of a percentage of achievement, the results obtained by subject 4 are 75%..

4. Intervensi-2 (B2)

Figure 4. Display of Target Behavior and Intervention Phase-2 Scoring Results

Referring to 2, the data obtained in the intervention phase-2 can be summarized as follows:

a. Subject 1 obtained an overall score in session 1 of 85. Meanwhile in session 2 the score obtained was 90. If accumulated in the form of a percentage of achievement, the results obtained by subject 1 were 87.5%.

b. Subject 2 obtained an overall score in session 1 of 85, while in session 2 of 95. If accumulated in the form of a percentage of achievement, the results obtained by subject 2 amounted to 90%.

c. Subject 3 obtained an overall score in session 1 of 90, while in session 2 of 100. If accumulated in the form of a percentage of achievement, the results obtained by subject 3 were 95%.

d. Subject 4 obtained an overall score in session 1 of 90, while in session 2 of 100. If accumulated in the form of a percentage of achievement, the results obtained by subject 4 amounted to 95%.

Based on the data that has been presented, it shows that the subject managed to experience improvement from each phase. This is evidenced by the increasing scores of each phase, so that the subject's target behavior can be seen through increasing percentages.

The results of the analysis within the conditions and analysis between the conditions of the subjects in this study showed positive results. Where at the analysis stage in conditions, changes in trend direction and changes in level in each subject, tend to experience an increase. Besides that, in the analysis between conditions, the subject obtained low data overlap in each phase, namely 0%. The lower the percentage of overlap, the better the effect of the intervention on the subject's higher order thinking skills.

The positive results that were proven from this study were due to the steps of the RADEC learning model which were in accordance with the conditions of students and could develop higher-order thinking skills. In the first step, namely the Read Step, students are asked by the teacher to read the material independently at home. This reading activity can stimulate students to get used to reading and develop literacy skills (Yulianti, et al. 2022). This reading stage provides students with provisions that are useful for developing higher-order thinking skills (Primary, et al., 2019). The Read step also provides habituation for students to behave as exemplified in the reading text so that environmental preservation behavior can be fostered (Siti, 2016).

After the Read activity, the second step is that students answer the pre-learning questions given by the teacher or the Answer step. The pre-learning questions that were developed contain concepts regarding sound material in class V in the science subject. These concepts result from teacher analysis adapted to teaching materials. Pre-learning questions given by the teacher are used to stimulate students to understand the reading and concepts to be learned, so that students can provide elementary clarification or in higher-order thinking skills as analytical skills (C4) (Yulianti, et al. 2022). Elementary clarification is an indicator of critical thinking skills which are also part of higher order thinking skills.

The third step is discuss, students discuss and agree on answers to pre-learning questions given by the teacher so that students get agreement on the correct answers. This stage can build basic skills (basic support) and make inferences (inferencing), both of which are part of higher-order thinking skills such as analyzing (C4) and evaluating (C5) (Satria & Sopandi, 2019).

The fourth step, namely Explain, students make presentations or convey their group answers in front of the class, thereby training students' high-level thinking skills on indicators to make further explanations (advanced clarification) (Yulianti, et al., 2022). This step can develop the ability to judge (C5). This step trains students to be able to have communicative thinking skills, so students can communicate the results of group discussions that have been carried out at a later stage (Sukardi et al., 2021).

The last step is Create, this step can develop higher-order thinking skills, because at the highest level of HOTS is Create or create (Pratama, et al., 2019). The activity in this step is to develop creative ideas and new ideas about the material in the IPAS. In addition to ideas and ideas, students can also develop their creativity through products. So it is clear that RADEC learning can improve students' higher order thinking skills in IPAS subjects

The results of this study have the urgency that the independent curriculum requires students to develop their higher thinking skills, one of which is in the science subject. Students are asked to be able to build new ideas and develop their mindset in solving problems in everyday life. The RADEC model is proven to be able to help improve students' high-order thinking skills, especially in the science subject in the independent curriculum. This model can be a reference for teachers to choose the right model and is suitable for implementation in the independent curriculum, which incidentally is the new curriculum in Indonesia.

Conclusion

Based on the findings and discussion above, the researcher can conclude that the RADEC learning model is able to help improve students' higher order thinking skills. This is evidenced by the increasing direction of the trend and the low overlapping data results. Subjects get 0% of the percentage overlap. The lower the percentage of overlap, the better the effect of the intervention on the subject's higher order thinking skills. The increase in students' higher-order thinking skills is due to the learning steps, namely Read-Answer-Discuss-Eplain-Create can develop higher-order thinking skills. The implications of the results of this study by having high-order thinking skills, students not only understand the material, but can also build new knowledge, ideas and ideas that can help students solve problems that exist at school or in everyday life and are wiser in making decisions. a decision. This research is certainly far from perfection, so the researchers suggest further research using a wider range of research subjects so that its benefits are more pronounced. Furthermore, RADEC learning research can be tried on several other subjects in the independent curriculum.

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