RADEC: An Alternative Learning Of Higher Order Thinking Skills (HOTs) Students Of Elementary School on Water Cycle

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Abstract. One of the strengths of the RADEC learning model is that learning focuses on teaching and problem-solving skills, so in other words, RADEC is a learning model that can develop students' Higher Order Thinking Skills (HOTS). Learning steps of RADEC consisted of 5 steps which were very easy to remember because they were in accordance with the name of the learning model itself, namely: (1) Read; (2) Answer (A); (3) Discuss (D); (4) Explain (Explain) and (5) Creat (C). At each step of learning RADEC, it can develop HOTS. Students must be able to explore and engage in the learning process so that students' higher-order thinking skills can be honed. In RADEC learning, each stage can develop high-level student skills including the step of Read. HOTS can be learned in this step by giving the widest opportunity for students to explore and find information from various sources both print and internet. The step of Answer, HOTS can be taught by asking students to look for various alternative answers and solutions. In the Discuss Stage, HOTS can be taught by not limiting students in submitting guesses, ideas, or opinions. The Explain Stage, HOTS can be taught by presenting and communicating the results of the agreement group answers honestly and responsibly, and the other groups will respond to it. While the last stage was Creat, in this step, HOTS can be taught by asking students to provide solutions with their creativity. The results showed that there was an increase in students' HOTS from an average of 41 to 84.6 after learning with the RADEC learning model.
1. Introduction

Higher Order Thinking Skills (HOTS) is thinking skills that are closely related to train the students with critical, logical, analytical, and systematic thinking skills [1]; [2] and [3]. The HOTS also has become one of the priorities in learning in school. In learning oriented-HOTS school, students are expected to be able to become qualified human beings that are able to survive and thrive the current global challenges [1]; [4] and [2]. Therefore, to respond to the global challenges, learners need to be trained to build and improve their HOTS from an early age. In fact, the low ability of children of Indonesia especially elementary school children is considered difficult and less enjoyable for the students.

Basically, learning is the process of adding information and new abilities. Student-centered learning ensures implementation of meaningful learning for students to encourage and build their own understanding [5]. However, learning in schools is currently more about conveying the material, text book oriented, less related to the daily lives of students, learning tends to be abstract, teachers pay less attention to students’ thinking abilities or in other words less creative learning [6]. This is not in line with the objectives of learning themselves, i.e. forming the ability to reason on students as reflected through the ability to think critically, logically, systematically, and have an objective, honest, and disciplined nature in solving problems both in the fields of Natural Sciences, mathematics and fields others in everyday life [1] and [4].

Teachers must develop the students’ HOTS by facilitating students to become better thinkers and problem solvers. Therefore, the implementation of learning in elementary school should be oriented on the issue. However, based on the reality, teacher have difficulties in applying the existing innovative models because some of the syntax is difficult to apply [7]. Because of this reason, the teacher must provide the problems that allow students to use high level thinking skills [8] and[4]. One of the problem-oriented learning models is the Read-Answer-Discuss-Explain-And Create (RADEC) Learning model. RADEC is an alternative learning model that is able to learn HOTS to the maximum. Because in addition to the learning steps that are very easy to remember, each step is able to attach high-level thinking skills to students. Therefore, this article will explain the stages of RADEC to encourage HOTS of students in elementary school, the potential of HOTS that appears in each stage of RADEC learning that is applied in the class, and learning outcomes that are able to increase HOTS of students in elementary school.

At the level of elementary school education, it has been carrying the thematic learning which learning is combined on a theme that relates the number of concepts in order to create experiences for students [9] the theme in question is the main idea of several concepts that become a unity in the discussion [10]. Associated with the discussion of the water cycle, it is also contained in one of the themes 8 subtheme 2 learning 1, based on the results of research [11] shows the results that the teacher is still difficult in conveying the concept of the water cycle to students. This material explains how the process of the water cycle occurs, and human activities that can affect water outside [12]. This material is very important to be learned by the students so that students understand how these natural processes in addressing, but this material is not easy to be delivered to the students. Teachers must be creative to provide an understanding of the concept of the water cycle so that we need an alternative learning model that can facilitate the teacher and students in studying the water cycle.

2. Methodology

2.1. Types of research

Research methods used in this research was a method of descriptive and week experiment [7]. This study aimed to describe the learning model the implementation of the RADEC learning model which was believed to be able to increase students’ HOTS, and the method used was the descriptive method.
While the week experiment method was used to answer the research objectives to describe the changes in the HOTS of students who were related to the implementation of the RADEC learning model as an alternative HOTS learning model in elementary schools.

2.2. **Subject of Research**

This study involves 32 people participants who came from one of the elementary schools at Bandung, West Java. Data collection techniques in this study used a sheet of observations about the potential HOTS that appeared when the RADEC learning model was implementation. While the test questions explored information about the HOTS the increase of students after the application of the RADEC learning model.

2.3. **Research Instruments and Data Analysis and Processing**

The observation sheet was conducted when the learning process was taking place. The results obtained were analyzed in descriptive potentialities of HOTS that appeared when RADEC learning was taking place. While HOTS tests were given problems before and after the RADEC learning process was taking place. This was conducted to see the increase HOTS of students, then the results are processed and analyzed quantitatively [7].

3. **Result and Discussion**

3.1 **The potential to teach Higher Order Thinking Skills (HOTS) through RADEC on the material of the water cycle**

Higher-order thinking skills (HOTS) according to [8]; [13]; [14] and [15] is a complex thought process that is carried out to find solutions, make conclusions, build representation, conduct analysis, and build relationships by involving a variety of groundless mental activities. Furthermore [16]; [17]; [4]; and [18] mentioned that HOTS links problem findings and creativity through the planning activities, observing the development of problems, and adjusting problem-solving strategies themselves.

Some experts explain the higher-order thinking skills are defined as the use of the mind to find new challenges [8]; [19]; [20]. higher-order thinking skills requires someone to apply new information or prior knowledge and manipulate the information to reach possible answers in new situations.

Based on the definition above, HOTS is a complex thought process to connect, manipulate, and transform the knowledge and experience that has been held to think critically and creatively in an attempt to determine the decisions and solve the problem on the new situation situations, and these cannot be separated from everyday life. Therefore, we need an alternative learning model that can facilitate the needs of students. One of the learning models is the RADEC learning model.

RADEC learning model is a learning model that in practice learning, it is very easy to be memorized its syntax and easy to be understood [7], this is because the learning step is an abbreviation of the name RADEC itself. Besides, according to HOTS-oriented learning principles, educators must be able to stimulate HOTS through various high-level questions, but in fact, the role of educators here is only to motivate and guide. The first step is Read. Educators ask students to read various reading material either print or non-print/internet. Before the first step is conducted, students are given a variety of questions pre-learning. The second step is the Answer. students are asked to answer questions. This is an important tool for educators to carry out HOTS learning for students. The third step is Discuss. At this stage, students in groups hold discussions related to answers to questions or the results of work that they have done outside the classroom or at home independently before the meeting of the class is started. The fourth stage is Explain. At this stage, it is performed in classical presentation activities. The material presented includes all indicators of learning cognitive aspects that have been formulated in the learning objectives. The fifth stage is Create. At this stage, educators...
inspire students to learn to use the knowledge they have mastered to spark ideas or thoughts that are creative [21].

Based on the above description, it can be seen that each step of RADEC can develop the entire principle to teach HOTS so that the RADEC learning model can be used as an alternative to teaching HOTS. Based on the results of observation during the learning process, it was found the findings the potential of being able to develop by learning HOTS through the RADEC learning model that can be seen in the table 1 below.

Table 1. The Potential of Learning HOTS through RADEC

| No | Step of RADEC          | The Potential to Teach Hots                                                                 |
|----|------------------------|---------------------------------------------------------------------------------------------|
| 1  | Read (Before Learning) | Potential to improve the skill to think critically and creatively If the reading material facilitates and demands students to have HOTS |
| 2  | Answer (Before Learning) | Asking questions that require students to think critically, creatively, and solve problems |
| 3  | Discuss                | Giving assignments to students where the tasks require critical thinking and creative thinking |
| 4  | Explain                | Giving the task of presenting and critiquing that require thought hots in the discussion |
| 5  | Create                 | Giving assignments to students to have ideas and share them with other students’ ideas and conduct project investigations and problem solving |

From the above table, it appears that each of the steps of RADEC potentially develops the HOTS (critical thinking skills, creative thinking, and problem-solving). Besides having the potential to develop HOTS, RADEC is also able to grow the abilities of multiliteracy, and character of students in each step of the lesson.

3.2 Improved Higher Order Thinking Skills (Hots) on The Water Cycle

After applying the RADEC learning model in elementary school, the average HOTS of students experienced a significant increase, and its results can be seen in Figure 1.
Figure 1. Students’ HOTS Improvement through RADEC Learning Models on Science Materials

Based on Figure 1. above, it can be seen that there is a significant increase in the HOTS of students. Where the average student pretest score was 41 and the value increased to 84.6 at the time of the posttest. Thus, we can conclude that only the learning of the RADEC model has a good influence on the improvement of students’ HOTS.

There are several possibilities that cause the increase after implementation of RADEC, e.g. RADEC model requires students to read, understand, think, and analyze their reading sources, and RADEC questions are in the cognitive domain C4, C5 and C6 [22] so that students get used to doing HOTS learning. For more details on the improvement of students’ HOTS, each indicator is described as follows.

3.3 Indicators that Measure in the HOTS (critical thinking skills, Creative thinking skills, and problem solving skills) on the water cycle

In this section, the research findings are related to the results of the improvement of each HOTS indicator HOTS indicators in this study include the skill of critical thinking, creative thinking and problem solving that must develop in students. The written tests were given to 32 students of class V before and after the implementation of RADEC. From the research that has been done, the results are obtained that the HOTS of Class V students on the water cycle material, in general, is still relatively low before learning RADEC. This is based on the results of the percentage of the average score of HOTS classified in the category of very less than the HOTS learners after learning RADEC. The following is an increase in each HOTS indicator before and after the implementation of RADEC.

Figure 2. Improved Data for Each HOTs Indicator.

Based on Figure 2, we can clearly see a significant improvement in HOTS test results for each indicator. The highest improvement in a row is problem-solving skills, critical thinking skills and creative thinking. Therefore, we can conclude that the RADEC is one of the learning models that are able to increase students' HOTS.
4. Conclusion
Research on RADEC learning as an alternative to increasing students' HOTS is a study that wants to prove that the RADEC model is a learning model that is suitable to be applied in elementary schools in Indonesia. That is because RADEC is designed according to the needs of development and the situation of education in Indonesia. The results indicate that RADEC learning in addition to being able to improve HOTS is also able to increase the multiliteracy and character of students. However, further research is needed, and more participants are needed to prove it.

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