RELEVANCE OF THE RADEC MODEL TO THE ESTABLISHMENT OF SCIENTIFIC ATTITUDE FOR ELEMENTARY SCHOOL STUDENTS

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ABSTRACT

The purpose of this study was to find the relevance of the experimental method and the teacher's efforts in applying the experimental method to increasing students' scientific attitudes in elementary schools. This type of research is library research. The process of collecting data is by tracing and examining previous research journals, theses and books that are relevant to the research variables. The results of the research show that: (1) The application of the experimental method can improve students' scientific attitudes. This is indicated by changes in students' scientific attitudes after using the experimental method in the learning process, namely an increase in student enthusiasm, a sense of self-confidence, courage in expressing opinions during the learning process, (2) The teacher's efforts while applying the experimental method so that students' scientific attitudes occur are by providing opportunities for students to be able to learn actively and carry out fun learning and encourage students to be able to carry out an experiment by directly involving the students themselves, so that the activity and scientific attitudes of students can increase.

Keywords: *RADEC Model, Science, Scientific Attitudes*
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1. INTRODUCTION

The learning process should be designed so that students are more active in finding things related to the material being studied. However, active involvement of students in science activities is still a classic problem in science which causes no positive scientific attitude to be embedded (Iksan et al, 2018). Based on its essence, learning Natural Sciences in every school, especially in elementary schools talks about three main things, namely products, processes, and scientific attitudes (Sardinah, Tursinawati, & Noviyanti, 2012). The nature of science, which consists of these three main components, is a characteristic of science learning. If one of these three components is not taught, then the science learning is not complete or has not fully taught the real science. One important aspect that is often missing in science learning in elementary schools is a scientific attitude that has not been explicitly taught to students. Scientific still receives less attention in science learning in elementary school attitudes (Sudana, 2018).

Learning needs to be designed so that students do not become passive individuals but actively organize their experiences in the learning process with their scientific attitude. However, the lack of student participation in scientific activities is still a classic problem in learning science which can cause it will not affect student learning outcomes and the level of understanding of science concepts will be lower so that students are unable to solve simple problems related to science in everyday life. As Sari (2018) found that the understanding of concepts and scientific attitudes has a significant influence. Ratnasari et al (2018) in his research revealed that science learning was not optimal and students did not show good scientific attitudes that had an impact on students' science learning achievement.

Science learning is dominated by the activities of teachers who teach it through conventional textbooks and occasionally carry out observational activities contained in the book. In addition, learning that does not pay attention to process skills, is oriented to success in answering exams or test questions, learning processes that tend to be rote-based, and not based on direct experience are factors that cause students' mastery of scientific attitudes to be low (Restami, Suma, & Pujani, 2013; Widiadnyana, Sadia, & Suastra, 2014).

This is also in line with the results of research conducted by Hartini (2014: 4) at SDI Mahima, Reok District, Manggarai Regency, which found that the learning process was implemented which was teacher-centered and the use of conventional learning methods resulted in passive students in the classroom. In line with that, research by Rosarina, et al (2016: 134) at Gudang Kopi 1 Elementary School revealed that the science learning process which was only teacher-centered and sourced from textbooks did not care about every student's scientific behavior and attitude had an impact on many things, including a decrease in student learning outcomes. study. Research by Mukhbitah, et al (2019) also found that students' involvement was only for listening, memorizing, and taking notes on the material being taught, reducing students' ability to understand the material. A decrease in understanding actually has an impact on curiosity and the urge to ask questions.

Whereas a scientific attitude is an attitude that needs to be possessed by a scientist in carrying out the process of investigation or research, for example, such as curiosity, honesty, hard work, unyielding, and openness (Tursinawati, 2013). Through inculcating a scientific attitude that is carried out well from an early age, students have the character to become true scientists who can change their principles and accept all differences towards something new (Sudana, 2018). A scientific attitude will also contribute to the ability of students to be sensitive to the surrounding environment, have a high desire to find out everything, and be able to solve environmental problems they face armed with their scientific skills (Tunisa, Kosasih, & Hamdu, 2017).

Referring to the problems above, it is necessary to apply a learning model that can create effective and efficient learning to improve scientific attitude. The learning model that encourages this scientific attitude is process-based learning and departs from students' prior knowledge, which can have a positive impact on the formation of students' attitudes and understanding (Sudana, 2018). However, this learning model is also not only able to actively engage students and encourage students' scientific attitudes, but can also be easily understood and applied by teachers in learning that has a large load of subject matter and a short time allocation.

One model that can be used to overcome the problems of this teacher is to apply the RADEC (Read, Answer, Discuss, Explain, and Create) learning model. The learning model is the RADEC (Read-Answer-Discuss-Explain and Create) learning model which was first introduced by Sopandi (in Lestari et al., 2021; Pratama, Sopandi, & Hidayah, 2019). The RADEC learning model is a learning model that uses its stages as the name of the model itself, namely read or read, answer or answer, discuss or discuss, explain or explain, and create or create.learning modelRead-Answer-Discuss-Explain and Create)Research conducted by Ilham et al. which mentions the significant influence of the RADEC learning model assisted by the Zoom application on the scientific attitude of class VI students at SDN Kalukuang 1 Makassar in the Covid-19 pandemic era which is shown based on the Sig (2-tailed) results of 0.000 (Ilham S, Syarifuddin, & Rukli, 2020). In addition, research conducted by Pratama et al. which can be concluded that the RADEC learning model can improve the scientific attitude of students in elementary schools as seen from the average post-test average score pretest of 40.44 which means there is an increase of 29, 54 (Pratama et al., 2020). This is also supported by research by Handayani et al. which states that the RADEC model is an alternative

learning model to improve students' scientific attitudes (Handayani, Sopandi, Syaodih, Suhendra, & Hermita, 2019).

The advantages of this model can be seen from the characteristics it has. The characteristics of the RADEC model in learning include: (1) involving students to be active in learning; (2) building the character of independent learners; (3) connecting students' prior knowledge with the material to be studied; (4) is contextual; (5) stimulate students to actively ask questions, discuss, propose investigation plans, and conclude the material that has been studied; and (6) facilitating students to be able to study the material in depth through pre-learning assignments (Pratama, Sopandi, & Hidayah, 2019).

Thus, this study aims to describe relevance the RADEC model to the establishment of scientific attitude for elementary school students. This research becomes necessary to do, considering the scientific attitude as one of the basic components in science learning that can affect the extent to which understanding and science learning outcomes are achieved (Kusuma, Rosidin, & Viyanti -, 2013; Razak & Kamaruddin, 2018)

2. RESEARCH METODOLOGY

The research method used in this article is a systematic review , namely a structured and planned review of previous articles (Aromataris & Pearson, 2014; Hariyati, 2010; Husniyati, 2021; Khan, Kunz, Kleijnen, & Antes, 2003; Hayatul Khairul Rahmat , Nurmalasari, Puryanti, & Syifa'ussurur, 2020; Widha, Rahmat, & Basri, 2021). Torgerson (in Hariyati, 2010) states that the purpose of a systematic review is to answer specific, relevant, and focused questions, synthesize results, reduce review, and identify research gaps. By using this method, the author wants to answer the research questions that have been mentioned in the introduction and to answer these questions requires systematic steps. Among the steps in the systematic review are

1) Defining the purpose of the review and specifying the type of evidence (facts and evidence) that will help address the purpose of the review. The purpose of review was made to find out the relevance of the RADEC learning model to the formation of students' scientific attitudes in learning science in elementary schools. The type of evidence used is evidence that explains that there is relevance between the RADEC learning model for the formation of students' scientific attitudes in learning natural sciences in elementary schools.
2) Determine a literature search strategy, starting from articles that have been published or not, limitations on the year of publication, the type of language used, limited to journal articles or also using conference proceedingsaccess methods online or offlinefor journals, and many others. This study uses previous articles that have been researched and then the results of the research are reviewed. The articles used are articles that have been published from 2018 to 2022, in Indonesian and English, and accessed online via Google Scholar with the keywords the relevance of the RADEC learning model to the formation of students' scientific attitudes in learning science in elementary schools.
3) Determine the type of research method used in the reviewedarticles. The types of research methods used as material for review are not limited to just one method, but use both qualitative and quantitative methods at the same time.
4) Combining the results, namely grouping the results of the review to get the intended meaning (evidence synthesis).
5) Combining the results of previous research is the core part of systematic review . Articles that are in accordance with evidence predeterminedThen from various previous research results will be synthesized (evidence synthesis).

6) Establish results, namely concluding the context or results of grouping reviews. The last step is to conclude the results of grouping reviews that have previously been carried out. The results of previous studies that have been synthesized are then concluded as answers to research questions that have been previously asked.

3. RELATED RESEARCH/LITERATUR REVIEW

Based on the search results, 21 articles were obtained that were considered in accordance with the research theme raised and then put together and screened whether the studies in the articles were the same or not. After screening, 12 articles were obtained that were in accordance with the study to be carried out by the author. Of the 12 articles that resulted from screening , they will be re-selected based on eligibility predeterminedreviewed. Of the 6 articles reviewed,two types of research methods were used, namely qualitative and experimental. From these 6 articles, data extraction was carried out by analyzing the data based on the author's name, title, purpose, research method, and results which are important data in the article. The results of the data extraction are as follows.

First, research conducted by Ilham S et al. (2020), the purpose of this study was to determine the effect of the RADEC learning model assisted by the zoom application on students' scientific attitudes in the Covid-19 pandemic era. The results showed that the average scientific attitude of students with the RADEC learning model was 87.14, while the discovery learning reached 80.21. This means that the RADEC learning model is better than the discovery learning model. This shows that RADEC learning assisted by the zoom cloud meeting application has a significant effect compared to the discovery learning learning model on students' scientific attitudes and science learning outcomes for class VI students at SDN Kalukuang 1 Makassar.

Second, Primary et al. (2020), this study aims to determine the effect of the RADEC learning model on the scientific attitudes of fifth grade elementary school students on the theme of ecosystems. The results showed that the RADEC learning model had a positive influence on students' scientific attitudes compared to the inquiry learning model. This was noticed from the average pretest score in the RADEC class of 40.44 and inquiry 38.14. While the average score of the posttest class RADEC 70.08 and 56.5 inquiry. The data shows that the increase in the experimental class reached 29.64, the control class 18.36. This shows that the RADEC learning model has a more positive effect than the inquiry learning model on students' scientific attitudes.

Third, Setiawan et al. (2020), the purpose of this study was to analyze the effect of the Read, Answer, Discuss, Explain, and Create (RADEC) learning model on the scientific attitudes of elementary school students on the topic of the water cycle. The results showed that the pretest scores for the experimental and control classes were 48.02 and 45.67, respectively. After applying the RADEC model, the posttest scores for the experimental and control classes were 85.85 and 79.05, respectively. Based on the Mann-Whitney test, a significance value of 0.00 is obtained, which means 0.00<0.05. It was concluded that the RADEC model has a positive impact, namely it can improve the scientific attitude of elementary school students on the water cycle material.

4. RESULTS AND DISCUSSION

The Read, Answer, Discuss, Explain, and Create (RADEC) learning model is one of the models developed in accordance with the character of the nation in Indonesia (Pratama et al., 2019). The RADEC learning model is also an alternative to innovative learning models based on the Indonesian education system, namely students are required to understand various scientific concepts within a limited time (Pratama et al., 2019). The steps of the RADEC learning model can be seen in Figure 1. The RADEC model begins with the Read. At this stage, students are asked to read the teaching materials that the teacher has arranged according to the indicators before starting learning or carried out at home. To guide students in the reading process, the teacher provides pre-learning questions that are arranged according to the indicators that students must achieve in science learning material. This reading activity is very important and must be included in the core learning process so that learning can be carried out more effectively and meaningfully.

To see student feedback at the Read, the next stage is Answer. At this stage, the teacher gives post-reading questions to see which students read and did not read. Furthermore, Answer is to show that before learning begins students already understand the material well. So that the next learning process can be focused on things that students have not understood.

Stage, Discuss it can be seen that students are active and enthusiastic, because previously students already had sufficient material to discuss issues regarding learning science. The discussion process in the RADEC learning model is certainly different from the inquiry learning model in the control class, because in terms of content, students who learn to use RADEC learning are more mature and ready. An active discussion process like this certainly encourages students to ask questions and learn to use problem-solving strategies, this is what builds HOTS (Petrovska & Veselinovska, 2013).

Activity Explain which requires this communication to occur is an integral part of innovative learning as contained in the syntax of the inquiry learning model which has been proven to be able to develop students' scientific attitudes (Duran & Dökme, 2016; HK Rahmat, 2019), however, the Explain stage in the learning model RADEC is more interactive and communicative. Presentation activities in inquiry learning tend to be less enthusiastic. This is because students are not fully able to learn from the inquiry process, in contrast to students in the RADEC learning model who have previously been provided with teaching materials. This proves that presentation activities are better for students who receive RADEC learning.

Furthermore, the final stage of the RADEC model, namely Create, is clearly able to develop students' scientific attitudes. Activities in this stage are developing students' creative ideas in product-making activities. The making of these products is not limited by the teacher, in the sense that the teacher frees students to realize their creative ideas in a work. This is in line with the research of Handayani et al. (2019) who concluded that the RADEC learning model can improve students' scientific attitudes. Thus there is relevance between the RADEC model and students' scientific attitudes.

The relevance of the RADEC learning model to improving students' scientific attitudes can be seen from the use of the RADEC learning model in learning that has a relationship and can affect the improvement of students' scientific attitudes. Students with the RADEC model are encouraged to strengthen their scientific background by providing pre-learning questions at the read and answer stage from various sources which are carried out at home. The pre-learning questions given are designed with various levels of contextual questions. Through this model, finally, students who already have sufficient prior knowledge are encouraged to actively participate and contextually link their knowledge to the material to be studied (Pratama et al., 2019). With active learning activities, students' attention to

the focus of the subject matter increases. With increasing student attention, their curiosity will also increase (Rusni et al., 2020). The design activities in this two-step model (read and answer), finally makes students accustomed to sharpening their curiosity about the material to be studied first.

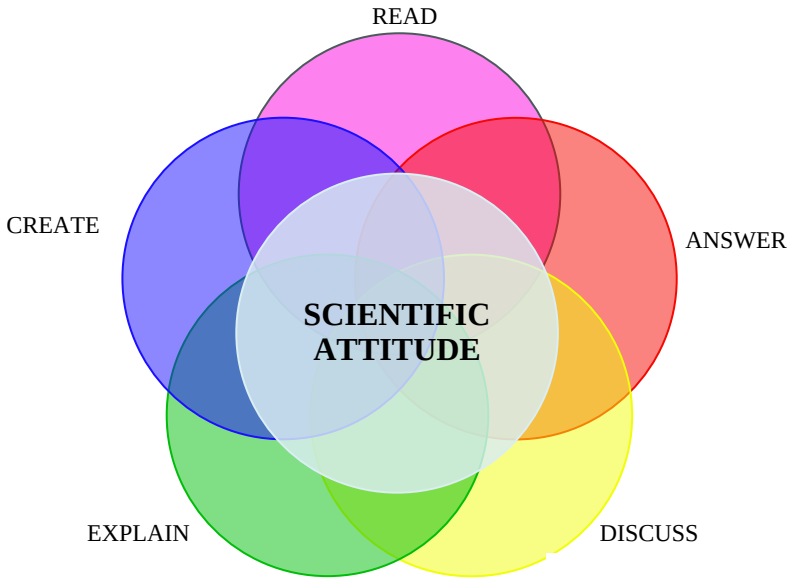

Figure 1. Steps of the RADEC Learning Model
Source: Pratama et al., 2019

The second aspect of scientific attitude is critical thinking. In this aspect, the profile of students' critical thinking, attitudes show a percentage level with a good category. As defined, the RADEC model is applied to develop character, critical thinking, problem solving, communications, collaborative, and creative thinking skills (Sopandi, 2019). On the answer stage, students are trained in their ability to think skeptically and can process information on the expected answers to the pre-learning questions given. Likewise, at the discussed stage, students are trained not to easily believe and doubt the answers found by other friends before it is logical to accept them. This is in line with the critical thinking attitude indicator used in previous research, namely the indicator asking for any changes or new things (Kusherawati et al., 2020).

In the aspect of openness and cooperation, it is shown that the profile of students' scientific attitudes for this aspect is in a very good category. This is supported by the steps of the RADEC model at the discuss and explain stage. At these two stages, students are trained to be able to exchange ideas and explain the results of their group work agreements. This can train students to actively participate in learning activities and be open to accepting differences of opinion. This is in line with the research findings, which explain that through group discussions, students can play an active role in expressing opinions and listening to the opinions of others, which has a significant effect on scientific attitudes (Kim, 2019).

This model is learning the steps that equip and strengthen students' prior knowledge of science, contextual, critical, collaborative, and stimulate students to

play an active role in building their knowledge. The characteristics of this model have an impact on increasing the profile of students' good scientific attitudes.

5. CONCLUSION

Based on the discussion above it can be said that the application of the RADEC learning model in science learning can improve students' scientific attitudes. This is indicated by changes in students' scientific attitudes after the RADEC learning model. This proves that there is indeed a relevance of the RADEC learning model to students' scientific attitudes. Students experience feelings of enthusiasm, confidence, and courage in expressing their opinions during the learning process.

In addition, it can be ascertained that the teacher's efforts to improve students' scientific attitudes are by providing opportunities for students to be able to learn actively and carry out fun learning. The teacher must encourage students to be able to carry out experiments by involving the students themselves directly, so that students' scientific activities and attitudes can increase

REFERENCE

Hartini. 2014. *Penerapan Metode Eksperimen Pada Pembelajaran IPA Materi Jenis Jenis Tanah Untuk Meningkatkan Hasil Belajar Siswa Kela V SDI Mahima Tahun 2013/2014*.Skripsi.PGSD. STKIP St. Paulus Ruteng.

Iksan, Z. H., Osman, K., & Salehudin, S. N. M. 2018. Take-Home-Experiment: Enhancing Students' Scientific Attitude. *Journal of Baltic Science Education*, *17*(5), 828-837.

Ilahi, M. T. (2012). Pembelajaran Discovery Strategy & Mental Vocational Skill. Yogyakarta: DIVA Press.

Mukhbitah, dkk. 2019. Penerapan Metode Eksperimen Untuk Meningkatan Pemahaman Siswa Konsep Dasar IPA. *Jurnal Pendidikan Guru Sekolah Dasar 4, (2).*

Pratama, Y. A., Sopandi, W., & Hidayah, Y. (2019). RADEC Learning Model (Read-Answer-Discuss-Explain And Create): The Importance of Building Critical Thinking Skills In Indonesian Context. *International Journal for Educational and Vocational Studies*, *1*(2), 109–115. https://doi.org/10.29103/ijevs.v1i 2.1379.

Ratnasari, I. T., Wardani, S., & Nuswowati, M. 2018. The Impact of Multiple Intelligences Approach through Quantum Teaching Model toward The Scientific Attitude and Science Learning Outcomes in The Fourth Grade Students. *Journal of Primary Education*, *7*(2), 146-154.

Restami, M. P., Suma, K., & Pujani, M. (2013). Pengaruh Model Pembelajaran POE (Predict- Observe-Explaint) Terhadap Pemahaman Konsep Fisika dan Sikap Ilmiah Ditinjau dari Gaya Belajar Siswa. *Jurnal Pendidikan Dan Pembelajaran IPA Indonesia*, *3*(1), 1–11.

Rosarina, dkk. 2016. Penerapan Model Discover Learning Untuk Meningkatkan Hasil Belajar Siswa Pada Matapelajaran Perubahan wujud Benda. Jurnal Pena Ilmiah.1, (1).

Sardinah, S., Tursinawati, T., & Noviyanti, A. (2012). Relevansi Sikap Ilmiah Siswa Dengan Konsep Hakikat Sains Dalam Pelaksanaan Percobaan Pada Pembelajaran IPA di SDN Kota Banda Aceh. *JURNAL SERAMBI ILMU*, *13*(2), 70–80. https://doi.org/10.32672/si.v13i2. 474

Sudana, D. (2018). PENGEMBANGAN INSTRUMEN SIKAP ILMIAH UNTUK SISWA SEKOLAH DASAR.. *Jurnal Ilmiah Sekolah Dasar*, *2*(2), 144–150. https://doi.org/10.23887/jisd.v2i 2.14098

Tunisa, F. R., Kosasih, K., & Hamdu, G. (2017). Pengaruh Model Latihan Penelitian terhadap Sikap Ilmiah Siswa di Sekolah Dasar. PEDADIDAKTIKA: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar, 4(2), 149–157.