APPLICATION OF RADEC LEARNING MODEL TO IMPROVE ELEMENTARY STUDENTS' SCIENCE LITERACY ON HUMAN DIGESTIVE SYSTEM MATERIAL

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Abstract

This study aims to determine how science literacy before and after using the RADEC (Read, Answer, Discuss, Explain, and Create) learning model, how the difference in the improvement of science literacy in the class used, namely the experimental class (RADEC model) and the control class (conventional model) and know how the implementation of science learning using the RADEC model on Human Digestive System material. The method used is Quasi Experiment with a Nonequivalent Control Group Design research design. The population of this study was a school in North Sumedang District with a research sample of grade V students totaling 112 students consisting of 56 female students and 56 male students. The instruments used were test instruments and observation sheets. The research data were processed using Microsoft Excel and SPSS applications. The data analysis technique used to process data is the average measurement using Microsoft Excel, while the normality test, homogeneity test, 2-group hypothesis test (t-test and U-test), and N-gain test using SPSS. The observation sheet instrument was processed by describing the research results based on objective conditions. Before using the RADEC model, literacy obtained an average of 55.9 with the low category and an average of 80.4 with the high category. In addition, there is a difference in the improvement of science literacy between the experimental and control classes. The experimental class test scores significantly increased more than the control class. The experimental class had an average value of 0.55, while the control class with a value of 0.30 based on the N-Gain Test. RADEC learning steps are well implemented according to its stages, starting from the (Read) stage, the teacher asks students to read the material, (answer) students answer pre-learning questions, (discuss) students discuss in groups, (explain) students present the results, (create) students make simple works according to creativity.

Keywords*:* Scientific Literacy, RADEC, Science Learning.

INTRODUCTION

Education is the main pillar in shaping the potential of the younger generation which involves various methods and learning models to achieve optimal goals. In line with the definition of education in the National Education System Law article 1 paragraph 1, it

[1]is explained that education is a learning climate that aims to develop a person's potential both spiritually, religiously, self-control, and personality to become a quality person and be ready to face all challenges in his life. It is known that education and science are two inseparable parts because, in the education process, there is a science and vice versa. Educational activities can be pursued by the learning process of the many disciplines. Learning science in elementary school is vital in forming the basis of students' knowledge and understanding of basic scientific concepts as the definition states that natural knowledge is a science that studies the universe and its contents, as well as events that occur in it through a series of scientific processes.

Science learning in elementary school fosters students' natural curiosity, developing curiosity in asking questions and seeking answers to natural phenomena based on evidence and scientific thinking patterns. Science learning is multidimensional and includes aspects of knowledge, skills, and attitudes. Science learning has different characteristics from other learning. This can be characterized by the scientific value contained, a collection of knowledge that is systematically arranged, contains theoretical knowledge and the concepts taught are interrelated with one another. Based on research conducted by Jufri (2017), it is stated that science learning in elementary schools has three general objectives. The first is to prepare students to study science widely at the next level of education. The second goal is to prepare students to have resilience in facing challenges in their future work fields, and the third goal is to prepare students to become members of society who have high intellect and are qualified in science literacy. About other objectives, science learning is closely related to its scope as an educational medium, as evidenced by gaining an understanding of the environment and natural resources that need to be preserved so that after studying science, students are expected to contribute actively to sustainable development in modern society as a form of embodiment of nature conservation. In line with the opinion which states that through science learning, students are expected to experience sustainable positive attitude changes for themselves and the surrounding environment according to 21st-century skills.

21st Century Skills refer to a group of essential skills to deal with the demands and changes in modern society and economy. According to Whitby (2007) in his research states that, 21st Century skills involve the ability to think critically and creatively, communicate effectively, the ability to innovate, collaborate with technological advances, and the ability to find solutions to problems through intellectual literacy in the surrounding environment. Science literacy is an essential aspect of 21st-century skills because it involves understanding scientific concepts and how a person can apply them in everyday life according to what he hears, feels, and does. According to de Boer (in Toharudin) 2011, who put forward science literacy for the first time was Paul de Hurt, who interpreted science literacy as an attitude and action in understanding science applied to people's lives. Science literacy has a literal meaning; literacy comes from the word *literatus*, which means literacy/movement and is derived from the word *scientia.* This means science as a whole science literacy can be interpreted as an individual's ability to empower scientific knowledge, identify questions, and conclude based on concrete evidence in deciding nature and humans.

Science literacy focuses on four interconnected aspects: context knowledge,

[1] Isrok'atun, Hanifah, N., Maulana & Suhaebar, *Integrative Mathematics and Science Learning through Situation-Based Learning,* UPI Sumedang Press (2020).

[2] Sujana, A, *asics of Science: Concepts and Applications,* UPI Press (2014).

competence, and attitude. This is in line with the opinion of the Organization for Economic Co-operation and Development (OECD) in 2019, which states that the ability to identify questions, construct new knowledge, provide scientific explanations, draw conclusions based on scientific evidence, and the ability to develop a reflective mindset to participate in addressing issues and ideas related to science is part of the implementation of science literacy based on the knowledge gained. The OECD announced the 2018 Program for International Student Assessment (PISA) scores for Indonesia in literacy and science. The PISA evaluation is carried out to evaluate the education system by measuring student performance in education, especially in science and literacy which is held every three years. The results of the PISA in 2018, with a score of 396, rank 70 out of 78 countries surveyed. Based on the data obtained by PISA, it can be concluded that the science literacy skills of Indonesian students are still deficient even though Indonesia has participated in the PISA research since 2000. The results reported by the OECD (2003, 2004, 2007, 2010, 2013, 2016) related to the results of Indonesian children's science literacy have an average score less than the average score of international standards, with the position always the lowest of the number of countries included in the assessment.

Currently, the government's effort to improve students' science literacy skills is to implement an integrated curriculum with the hope that students can understand the subject matter holistically and integratively. However, providing learning facilities has not supported these efforts, whether science literacy-based textbooks or science literacy skills questions as an evaluation tool. As previous research states that the prevailing objective conditions do not meet the requirements for achieving goals in improving literacy, such as science textbooks used in schools do not contain science literacy questions such as PISA questions. When there is no habituation to work on questions that require literacy skills in understanding a discourse/reading, students will not succeed in answering these science literacy questions optimally.

According to several studies conducted by Suparya (2022), one of the causes of low science literacy and students' environmental care attitudes includes the use of inappropriate approaches, methods, strategies, and learning models, as well as learning that tends to be teacher-centered. Various studies that examine science literacy in science learning have been carried out, including by applying methods, models, and learning tools using various research designs and subjects. In addition, several problems were also found in research conducted by Fadlika (2020), such as students not being able to identify scientific opinions, search the literature, understand research design elements, make graphs, solve problems, understand and interpret basic statistics, and draw conclusions optimally. Relevant to the results of the PISA and TIMSS surveys that several factors are causing the low science literacy of students in Indonesia, among others, related to the use of student textbooks that have not been adapted to learning needs, the occurrence of misconceptions in students, non-contextual learning, low reading skills so that it becomes one of the main factors that trigger student learning obstacles, the influence of the environment and learning climate that lacks quality, school infrastructure has not supported the implementation of practical learning, and resources that have not been able to be competitive in educating students.

Another problem that arises is that literacy-based science learning is not easy for students at the primary school level. This was found in previous research conducted at SD[2]

[3] Nurpratiwi,A., Hamdu, G., & Sianturi, R. *Elementary School Students' Science Literacy through the Read-Answer-Discuss-Explain-And-Create (RADEC) Learning*. (2023).

Negeri Kupang 03 Ambarawa District, Semarang Regency, Central Java. Based on the results of a document study of student test scores and the results of interviews between students and grade 6 teachers, some information was obtained that classroom learning was not meaningful, characterized by explanations that lacked detail and touch so that students were not able to absorb the material well even though the teacher had related the material to everyday life. Furthermore, the evaluation tools used to measure students' abilities in practice questions still use LKS and package books, so students are only focused on working on questions on the LKS and package books. Even during daily tests, teachers use questions with low cognitive characteristics and rely only on memorization skills. In addition, there is a lack of widespread understanding of teachers related to science literacy, so there is no clear description of how science literacy skills in each student.

The results of interviews obtained from several elementary school teachers in Sumedang District in the field of Science show that (1) there are still many teachers who are not familiar with the term science literacy, (2) they do not know the evaluation program for science literacy skills conducted by international parties such as TIMSS and PISA, (3) among them still have difficulty in developing learning tools, including the development of science literacy questions. This condition is an obstacle for Indonesian students to compete in the PISA assessment. Meanwhile, global competition requires students to be able to compete in the world arena. Science literacy needs to be honed by providing valid and reliable science literacy instruments. A valid instrument can be used to assess valid educational outcomes, but it needs the support of various learning methods and models to achieve optimal goals.

Based on the results of a literature review of several previous studies, which state that science literacy requires learning based on student active learning, the researchers try to recommend an innovative learning model that can be used to overcome this problem, namely through the application of the Read, Answer, Discuss, Explain, and Create learning model, or known by the abbreviation RADEC.

In a study conducted by Sopandi in 2017, it was found that the RADEC learning model is a learning model with a sequence of implementation steps consisting of reading, answering, discussing, explaining, and creating. This sequence of activity steps is the basis for mentioning the RADEC learning model. One of the advantages of RADEC learning besides being developed based on constructivism learning theory, this learning is easy to remember and apply by teachers. This innovative learning model focuses on student proficiency in HOTS (High Order Thinking Skill) learning, multiliteracy learning, and character learning as 21st-century skills. The characteristics of RADEC learning are as follows: (1) Motivating students to participate during learning actively. (2) Motivating students to learn independently. (3) Linking students' knowledge with the lesson's content. (4) Contextualized, connecting the lesson content with actual phenomena. (5) Open opportunities for students to actively ask questions, discuss, propose experiment plans, and draw conclusions from the material content explored. (6) Through pre-learning questions, provide opportunities for students to explore the subject matter comprehensively. Judging from the above characteristics, RADEC as a learning model can be a problem-solving option in helping teachers develop students' science literacy in their classrooms. The characteristics of RADEC can be used to solve the problem of low science literacy.

[4] Utami, S. H. A., Marwoto, P., & Sumarni, W. Analysis of Science Literacy Abilities in Elementary School Students Viewed from the Aspects of Science Content, Process and Context. *Jurnal Pendidikan Sains Indonesia,* (2022).

Ultimately, the RADEC learning model is a universal science learning strategy that builds mastery of concepts in students and student-centered learning by carrying out activities to collaborate, solve problems, and produce an idea/work. In the RADEC learning process, students are required to be directly involved in the learning process so that the students themselves determine the significant influence on learning success. The principle of the RADEC learning model and a prerequisite for success in implementation is that all students must have the potential and capacity to learn independently and have higher learning motivation in mastering knowledge and skills. The RADEC learning model is undoubtedly supported by appropriate learning tools, meaning that it is tailored to the needs and development of students. A critical element in measuring science literacy is using literacy assessments tailored to the level of thinking. The assessment used in the test must cover from the lowest to the highest, with a comparable proportion according to the level of education. The description test form allows test takers to organize ideas and/or things that have been learned using their own words. For the scoring results to be objective, scoring guidelines are needed. Scoring is done at each step of the process. For example, writing the formula, calculating, interpreting and concluding the results. Scoring is hierarchical according to the steps of working on the problem, while the score's weight for each item is determined based on the difficulty level. Difficult questions are given greater weight than easy questions. The next test is a performance based on the results of observations of student performance, behavior, or interaction in specific tasks. This assessment is more appropriate for assessing students' competence in solving problems in groups and participating in group discussions, not forgetting to design instruments and assessment rubrics to measure students' abilities.

Based on the problems behind the research, the author wrote this research with the title "Application of RADEC Learning Model to Improve Science Literacy of Elementary Students on Human Digestive System Material" to know: 1) How is the science literacy of grade V students before and after learning with the RADEC model on the material of the Human Digestive System? 2) What is the difference in improving the science literacy of fifth-grade students on the material of the Human Digestive System between the experimental and control classes? 3) How is the implementation of the RADEC model in class V on the material of the Human Digestive System?

RESEARCH METHODS

The method used in this research is the Quasi Experiment method with the research design of Nonequivalent Control Group Design involving two research groups, namely the experimental class that applies the RADEC learning model and the control class that applies the conventional learning model with the lecture method can be seen as in table 1.

Table 1. Nonequivalent Control Group Research Design

No.	Group	Pre-test	Treatment	Post-test
1	Experiment	O_1	X	O_2
2	Control	O_3	-	O_4

Source : (Sugiyono, 2013)[3]

[5] Sugiyono. *Educational Research Methods: Quantitative, Qualitative, and R&D Approache*. Alfabeta. (2013).

[6] Sukardi, R. R., Sopandi, W., & Riandi, R. Repackaging RADEC learning model into the online mode in science class. *Journal of Physics: Conference Series*, (2021).

Description:
O_1 : Pre-Test (test before going through science learning using the RADEC model).
O_2 : Post-Test (test after going through science learning using RADEC model).
X : Treatment (science learning using RADEC model).
O_3 : Pre-Test (test before going through science learning using conventional learning with lecture method).
O_4 : Post-Test (test after going through science learning using conventional learning with lecture method).

This research was conducted at one elementary school in Sumedang Regency, West Java, using a random sampling technique for school selection. The sample from this research was 112 class V students consisting of 56 female students and 56 male students. The research sample was divided into two groups, so the results obtained were that classes VB and VC became experimental classes with 56 students and classes VA and VD became control classes with 56 students, which were adjusted according to abilities based on the pre-test results of both classes and also student characteristics. The sample was chosen according to the needs of this research, where students have better average abilities, such as even distribution of initial reading abilities. This research was carried out in November 2023. The object of the research was students' scientific literacy in science learning using the RADEC learning model.

The instruments used in this study are a test instrument in the form of description questions related to science literacy in science learning of Human Digestive System material and an observation sheet. The science literacy test is carried out in two stages: the pre-test stage, which aims to see students' initial science literacy, and the post-test stage, which aims to see students' science literacy after learning. This instrument also measures improvement differences between experimental and control classes. The research test instruments at the pre-test and post-test stages were prepared based on aspects of science literacy, which were described into several indicators, including context, content, and process. They had the same characteristics and number of questions, namely 20 description questions, as seen in Table 2. The scoring guidelines used in scoring literacy tests can be seen in Table 3.

Table 2. Aspects of Science Literacy according to PISA 2015/2018

Aspects of Science Literacy	Explanation	Item
1. Content	Understand the concept of the material being taught (understanding scientific phenomena).	Explain the function of the mouth in the human digestive system!
2. Context	Solving problems in everyday life.	One of the common digestive disorders is ulcers, the symptoms of pain and stomach heat. Why does this happen? Explain!
3. Competencies	The skills to explain or describe scientific phenomena	Create a work that illustrates a healthy lifestyle or is related to the human

	begin to design and evaluate scientific work.	digestive system. Describe the process of designing, making, and the results!
4. Science Attitude	Respond to scientific phenomena and bring out a scientific attitude towards problems that arise in everyday life.	What would you do if you saw a classmate eating and drinking while talking and chewing quickly?

Source: (Kusumawardhani et al. 2021). Quoted from OECD (2019).

Table 3. Scoring Guidelines for Science Literacy Test of Human Digestive System Material

Score	Assessment Criteria
3	Students answer correctly according to the answer key provided.
2	Students answer less precisely or close to the available answer key.
1	Students answer the question but wrong or not by the available answer key.
0	Students do not answer at all.

Before the instrument was used in the study, the students were tested first. After testing the questions, the instrument was analyzed using validity and reliability tests. The research data were processed and analyzed using Microsoft Excel and SPSS applications. Data analysis techniques used to process data are average measurement using Microsoft Excel and normality test, homogeneity test, 2 group hypothesis test (t-test2 and U-test), and N-gain test using SPSS. The observation sheet instrument was used to determine the implementation of learning using the RADEC model for teachers and students by looking at how students answer pre-learning questions, discuss answers, present group performance, and create work, as seen in Table 4.

Table 4. RADEC Learning Implementation Observation Sheet

RADEC Stage	Observed Aspects
Read Stage	The teacher asks students to read the material at home on the LKPD and watch the learning video provided.
	Students read the material at home on the LKPD and watch the learning video.
Answer Stage	The Teacher asks students to answer the pre-learning questions on the LKPD provided at home.
	Students answer the pre-learning questions on the LKPD available at home.
Discuss Stage	The teacher asks students to discuss in groups during class.
	Students discuss in groups during class.
Explain Stage	The teacher asks students to present the results of their group work, carried out by 1 representative from each group.
	Students present the results of group work in front of the class.
Create Stage	The teacher asks students to create simple works related to the

	human digestive system and how to implement a healthy lifestyle.
	Students create works based on each group's ideas and report the results on the activity report.

DISCUSSION

The first research objective was to determine students' scientific literacy before and after using the RADEC learning model. This research shows that scientific literacy after learning using the RADEC model is higher than initial proficiency. This is proven by looking at the average pre-test and post-test scientific literacy as below:

Table 5. Mean Score of Pre-Test and Post-Test of Science Literacy Using RADEC

Test Results	Mean Value
Pre-Test	55,9
Post-Test	80,4

Table 6. Student Science Literacy Categories

Value	Category
76 – 100	High
56 – 75	Medium
< 56	Low

Source : (Vasthi (Science literacy category) n.d.). Quoted from Pratiwi (2017).

Table 5 shows the mean scores of the pre-test and post-test of science literacy in the experimental class, showing how literacy was before and after RADEC learning. Science literacy before RADEC learning obtained results with an average value of 55.9, which is in the low category. While science literacy after RADEC learning obtained results with an average value of 80.4 which is in the high category. So, it can be concluded that science literacy before going through the RADEC learning model is lower than science literacy after going through learning by using the RADEC model. This is relevant to the research conducted by Jaenudin (2022), which states that the RADEC learning model significantly affects students' science literacy.

The second research objective was to determine the difference in the improvement of science literacy of fifth-grade students on the material of the Human Digestive System between the experimental and control classes. After the research was carried out, the results were obtained that there was a difference in the average scientific literacy between the experimental class using the RADEC learning model and the control class using the conventional lecture-based learning model. The data analysis used is to find the N-Gain value, but before doing the test, it is necessary to have a prerequisite test first, namely by conducting a normality test, homogeneity test, and hypothesis testing. The normality test is[4] carried out to determine whether the data obtained is normally distributed. The following are the results of the Kolmogorov-Smirnov[a] normality test with a significance level of 5% or $\alpha = 0.05$ because the data obtained for each class is > 30.

[7] Putri, C. A., & Zulfadewina, Z. The Influence of the STEAM-based RADEC Learning Model on the Science Literacy of Grade IV Elementary School Students. *Jurnal Elementaria Edukasia*, (2023).

Table 7. Normality Test Results of Pre-Test and Post-Test of Control and Experimental Classes

	Kolmogorov-Smirnov[a]		
	Statistic	*df*	*Sig.*
Experiment Pre-Test	.115	56	.064
Experiment Post-Test	.123	56	.034
Control Pre-Test	.083	56	.200*
Control Post-Test	.143	56	.006

Table 7 shows the results of the normality test of the experimental pre-test value obtained a significance value of 0.064 so that it is normally distributed, as well as the results of the normality test of the control pre-test value obtained a significance value of 0.200 so that it is normally distributed. It can be concluded that the experimental and control class pre-test data are both normally distributed because the significance value is> 0.05. The experimental post-test value obtained a significance value of 0.034, so the data was also abnormally distributed. As the results of the normality test of the post-test value of the control class obtained a significance value of 0.006, it could also be said that the data was not normally distributed. In the end, it can be concluded that the experimental post-test and control post-test data are both abnormally distributed because the significance value <0.05. After conducting the normality test, the next prerequisite test is the homogeneity test, this test is carried out to determine whether the pre-test and post-test data of the control and experimental classes have homogeneous variants. The homogeneity test in this study was carried out using the Levene Statistic test with a significance level of 5% or $\alpha = 0.05$. The results of the homogeneity test can be seen in the following table:

Table 8. Homogeneity Test Results of Pre-Test and Post-Test of Control and Experimental Classes

	Kolmogorov-Smirnov[a]			
	Levene Statistic	*df1*	*df2*	*Sig.*
Based on Mean	1.932	3	220	.125
Based on Median	1.922	3	220	.127
Based on Median and with adjusted df	1.922	3	198.641	.127
Based on trimmed mean	1.913	3	220	.128

Based on the table above, the significance value obtained is > 0.05, so the data is homogen. It can be concluded that the pre-test and post-test scores of the experimental and control classes in this study have homogeneous variants. Next, the research hypothesis test was conducted. This hypothesis test uses a 2-group hypothesis test, which is carried out to determine whether there is a difference between the pre-test and post-test scores of the control class and the experimental class. Based on the previous prerequisite test, it is known that the pre-test data are both normally distributed, homogeneous, and free samples, so the pre-test hypothesis test is carried out using the t-test2. The results obtained can be seen in Table 9.

Table 9. Test Results - t2 Pre-Test Values of Control and Experimental Classes

		Sig. (2-tailed)
Learning Results	*Equal variances assumed*	.004
	Equal variances not assumed	.004

Based on the table above, the significance value of the pre-test results of the control and experimental classes using the t-test is 0.004 <0.05, so H_0 is rejected, and H_1 is accepted.

H_0: There is no difference in the pre-test in the experimental class, and the control class → H_0 is rejected.

H_1: There is a difference in pre-test in the experimental class and control class → H_1 is accepted.

It can be concluded that the pre-test hypothesis test using the t-test2 shows a difference between the pre-test in the experimental class and the pre-test in the control class. This is influenced by many factors, one of which is the objective conditions of the study. It is known that there are differences in student abilities between the control class and the experimental class. This information was obtained based on the results of the teacher's analysis at the school that the experimental class had a high average ability, in contrast to the control class where the students had an average ability. Apart from student abilities, it is also seen that learning enthusiasm where the experimental class has high enthusiasm or motivation to learn when compared to the control class which has lower learning enthusiasm. This can be influenced by different classroom management, such as the real conditions obtained from the research results that the experimental class has a science learning schedule in the morning so that students' learning focus is still high as well as conducive classroom management so that students can learn optimally, in contrast to the control class which has a learning schedule in the afternoon after recess so that at least it can affect students' focus while learning coupled with classroom management that tends to be less conducive.

The next data processing process was hypothesis testing for the post-test. Based on the previous prerequisite test, it is known that the post-test data are both abnormally distributed because the significance value is <0.05, so the post-test hypothesis test is carried out using the Mann-Whitney U-test. The results of the data processing can be seen in Table 10.

Table 10. Mann-Whitney Test Results Post-Test of Control and Experiment Classes

	Post-Test
Mann-Whitney U	1026.000
Z	-3.158
Asymp. Sig. (2-tailed)	.002

Based on the table above, the significance value of the post-test results of the control and experimental classes using the Mann-Whitney U-Test is 0.002 <0.05, so H_0 is rejected, and H_1 is accepted.

H_0: No difference in the post-test in the experimental and control classes → H_0 is rejected.

H_1: There is a difference in post-test in the experimental class and control class → H_1 is accepted.

It can be concluded that through the post-test hypothesis test using the U-test, there is a difference between the post-test in the experimental class and the post-test in the control class. Furthermore, the N-Gain test was conducted to find out the difference in the increase in science literacy between the control and experimental classes, which can be seen in Table 11.

Table 11. N-Gain Test Results

Test Results	***N-Gain (average)***
Experiment Class	0,55
Control Class	0,30

Based on the above N-Gain calculation, scores on the experimental and control class test results differed. The experimental class using the RADEC model has an average increase of 0.55, while the control class has an average increase of 0.30. It can be concluded that there is a difference in improvement between the control and experimental classes. The test scores in the experimental class have a greater improvement than the control class, proving that learning science using the RADEC model influences improving students' science literacy.

The third research objective is to determine how to implement science learning on Human Digestive System material using the RADEC model. Therefore, based on the results of observations made in the experimental class, it was found that students experienced increased science literacy. The phases in the RADEC learning model have a big effect in improving students' science literacy because these phases can train students to think, work together with groups, communicate ideas and ideas, and realize with good planning, implementation, and evaluation in solving problems in everyday life and making work. In addition to expanding knowledge with the RADEC model, it fosters a spirit of independence in students so that they can explore the world of learning according to each individual's enthusiasm and seriousness of learning. The third research objective is to determine how to implement science learning on Human Digestive System material using the RADEC model. Therefore, based on the results of observations made in the experimental class, it was found that students experienced increased science literacy. The phases in the RADEC learning model have a big effect in improving students' science literacy because these phases can train students to think, work together with groups, communicate ideas and ideas, and realize with good planning, implementation, and evaluation in solving problems in everyday life and making work. In addition to expanding knowledge with the RADEC model, it fosters a spirit of independence in students so that they can explore the world of learning according to each individual's enthusiasm and seriousness of learning.

This RADEC learning model is carried out by the Read, Answer, Discuss, Explain, and Create stages, which are observed in students and teachers. The reading stage (Read) is carried out before learning activities in the classroom. In this phase, the teacher directs students to read and other teaching materials independently from home before class learning activities begin. Teaching materials have been adapted to the material discussed at the next meeting regarding the Human Digestive System. In this phase, students are

stimulated to prepare themselves to receive material and prepare information that will be discussed during the class learning process so that they have gained a comprehensive understanding and are ready to exchange ideas with other students. The reading phase can be measured because it is included in the science literacy indicators where students are required to be literate in the surrounding world and gain understanding independently. Based on student observations, it can be obtained that, on average, students carry out reading phase learning well at home. Still, several factors renew the learning process independently, including parental encouragement and the surrounding environment. This is evidenced based on student observation sheets indirectly based on information from class teachers who interact with these students. The end of the reading stage is also followed by the (Answer) stage or answering questions.

This answering stage is intended by the teacher's behavior that provides pre-learning questions to students along with instructions in the reading phase so that students can answer these questions by the desired learning outcomes at home. This pre-learning question is in the form of a description question. The material taken has been adapted to the teaching material and science literacy indicators, including aspects of content (about understanding the material), context (material links to everyday life), and student attitudes. In this answer stage, students are given LKPD (Learner Worksheet), which contains reading material by the read phase instructions and questions that must be answered individually and in groups so that it requires students to provide varied answers and be ready to exchange ideas with other students when class learning begins. Another interesting finding is that, on average, students can answer pre-learning questions according to the knowledge they have acquired in the reading stage. However, some still cannot answer according to the right content, context, and attitude. This answering phase can be measured because it is included in students' science literacy indicators. Not forgetting to end this read-and-answer phase, the teacher provides information for students to prepare their learning outcomes at home to be discussed in groups at school and reminds students to bring the LKPD that has been distributed during class learning.

The next stage is the discussion stage in groups during class. The purpose of this phase is to provide opportunities for students to discuss their prior knowledge and exchange opinions about the answers to the pre-learning questions with group members. At this stage, the teacher divides into 7 groups, each consisting of 4 members heterogeneously so that the discussion process can run effectively. After the teacher divides the group, the teacher asks students to discuss their learning results to produce group answers on the LKPD sheet in the group answer column. At this stage, the teacher ensures communication between students in each group to get the most appropriate answer. The teacher acts as a facilitator in accompanying the discussion of each group while the students are the ones who play an active role in discussing their group's answers. In this phase, the teacher must also understand the various characteristics of students in carrying out discussions, ensure group discussions run smoothly, and conduct monitoring safaris in each group in the class so that the teacher also gets which groups have mastered and understood the material well. Students are required to be more active in this phase. There are some interesting findings: the enthusiasm for learning among students in groups is so high, on average, students discuss actively with each other and even exchange opinions and produce one group answer based on the dynamics of discussion, which proves that students can learn exploratively to develop. Another finding is that some students have not been able to communicate well with fellow students, so the teacher plays a role in guiding these students to be more courageous in expressing their opinions and providing opportunities

for other students to help with these difficulties. This discussion stage can be measured because it is included in the science literacy indicators.

The next phase is explained, where the teacher asks group representatives to present their work to other students. If one group is presenting their work, other groups have the right to listen carefully and be able to provide responses or rebuttals to fellow groups. In this phase, students are enthusiastic because the teacher gives appreciation in the form of star points as learning media prepared by the teacher. Each group that has performed will be given 1-star point on the prepared scoreboard. Not only that, the teacher will also give the next star to groups that can ask questions. This phase is an important phase of the learning part because the teacher must ensure that other students can understand the material presented by the student well. In addition, students are also required to be more active in providing responses, asking questions, and providing different answers during class learning activities. In this phase, there are various assessments ranging from student skills in delivering material, to how scientific attitudes are raised and include measurement of science literacy aspects of content, context, and attitude assessment. At the end of explaining activities, the teacher also has the opportunity to provide additions by conveying material that has not been conveyed comprehensively so that the material can be accepted by students as a whole.

The last phase of this learning is the create stage, which inspires students to apply the knowledge they have learned about the human digestive system to generate ideas or creative thoughts in free form. At this stage, the teacher asks students to create a simple work related to the material of the human digestive system and its relation to maintaining a healthy lifestyle in everyday life on the LKPD Create that has been provided. In the LKPD, several examples of works have already been made so that students determine what work to choose, or if they have other ideas, they can make it according to the group design. In this phase, the teacher provides the widest possible opportunity for students with working time in the classroom. It can be continued outside of class hours if it is not finished. When the work created is complete, students in groups can write activity reports on the Create LKPD that have been distributed by the teacher beforehand. From the results of observations obtained, the results of the work made vary greatly. Some examples of works include poetry, concept maps, posters, songs, simple props, and many others integrated based on modern technological advances. Of course, this is supported by facilities that meet the needs.

The five phases require students to play an active role in learning how to learn independently, explore the world of learning, dare to express opinions, provide different answers, ask questions, and increase enthusiasm for competitive learning in the classroom. Thus, the RADEC learning model is an appropriate alternative for improving students' science literacy, including content, context, and scientific attitudes.

CONCLUSION

Applying the RADEC Learning Model to Human Digestive System material in elementary schools has proven its success in improving students' science literacy. Through this approach, students are not only passive concept understanders but also actively involved in activities such as reading, asking questions, discussing, conducting experiments, and creating a framework. Based on the study results, it can be concluded that several significant things, including science literacy before going through the RADEC learning model, are lower than science literacy after learning using the RADEC model.

In addition, through this learning model, another significant thing is the difference in improving science literacy between the control and experimental classes. The test scores in the experimental class had a greater increase than the control class, which was proven based on the N-Gain calculation, which stated that the experimental class had an average increase with a value of 0.55. In contrast, the control class had an average increase of 0.30. This is reinforced by the hypothesis test of the pre-test results between the control class and the experimental class using the t-test2 stated that there is a difference between the results of the pre-test in the experimental class and the pre-test in the control class.

Ultimately, the results showed increased students' science literacy towards science material, especially regarding the human digestive system. First, the RADEC model provides opportunities for students to develop better reading skills. Second, students' involvement in discussions and experiments helped improve their ability to relate science concepts to the real world. Third, creating thinking patterns by students is an important step in summarizing and organizing information. Fourth, honing students' skills in presenting material becomes a means of practice to continue to develop courage in conveying useful information. Fifth, the experience of making work allows students to play in the vehicle of their creativity.

However, consistent and sustainable efforts are needed to maximize this learning model's success. Teachers must continue to encourage students' active participation, compile materials appropriate to their level of understanding, and continue developing innovative teaching strategies. Suggestions include consistency in model implementation, active student involvement, material adjustment, technology utilization, and continuous evaluation. With these steps, it is expected that students' science literacy not only improves on specific materials but also forms a solid foundation for understanding further science concepts in the curriculum.

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