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The Effect of Radec's Learning Model Assisted by Zoom Application on Science Critical Thinking Ability during Covid-19 Pandemic Era

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Abstract

This study aims to determine the effect of the RADEC learning model assisted by the zoom application on students' critical thinking skills in the Covid-19 pandemic era. This type of research is a quasi experimental research design type nonequivalent control group design. The population in this study were all sixth grade students of SD Negeri Sekompleks Kalukuang Makassar City which consisted of 4 schools with a total number of students being 203 and the research sample was 56 students of class VI SDN Kalukuang 1 Makassar with a random sampling technique. Data collection techniques using test techniques, test techniques are used to determine critical thinking skills in the form of 6 item essay questions. The data analysis technique used independent sample t-test analysis. The results of the study based on descriptive analysis show that the average critical thinking skills of the RADEC learning model are 87.14 and the discovery learning learning model reaches 80.21. This means that the RADEC learning model is better than the discopery learning model, while the inferential analysis results show that the RADEC learning model assisted by the zoom cloud meeting application has a significant effect compared to the discovery learning model on critical thinking skills and science learning outcomes of class VI SDN Kalukuang 1 Makassar. . This is based on the independent sample t-test, the Sig (2-tailed) value is 0.000 <0.05. This means that the RADEC learning model is better than the discopery learning model, while the inferential analysis results show that the RADEC learning model assisted by the zoom cloud meeting application has a significant effect compared to the discovery learning model on critical thinking skills and science learning outcomes of class VI SDN Kalukuang 1 Makassar. . This is based on the independent sample t-test, the Sig (2-tailed) value is 0.000 <0.05. This means that the RADEC learning model is better than the discopery learning model, while the inferential analysis results show that the RADEC learning model assisted by the zoom cloud meeting application has a significant effect compared to the discovery learning model on critical thinking skills and science learning outcomes of class VI SDN Kalukuang 1 Makassar. . This is based on the independent sample t-test, the Sig (2-tailed) value is 0.000 <0.05.

Keywords:*RADEC Learning Model, Zoom Application, Critical Thinking, Covid-19*

Abstract

This study aims to determine the effect of the RADEC learning model assisted by the zoom application on students' critical thinking skills in the covid-19 pandemic era. The type of research used is a quasi-experimental design type nonequivalent control group design. The population in this study were all sixth grade students of SD Negeri Sekompleks Kalukuang Makassar City which consisted of 4 schools with a total number of students was 203 and the research sample was class VI students of SDN Kalukuang 1 Makassar totaling 56 people with random sampling sampling technique. Data collection techniques used test techniques, test techniques were used to determine critical thinking skills in the form of 6-item essay questions. The data analysis technique used independent sample t-test analysis. The results of the study based on descriptive analysis showed that the average critical thinking skills of the RADEC learning model was 87.14 and the discovery learning model was 80.21. This means that the RADEC learning model is better than the scopery learning model, while the results of the inferential analysis show that the RADEC learning model assisted by the zoom cloud meeting application has a significant effect compared to the discovery learning model on critical thinking skills and science learning outcomes for grade VI students at SDN Kalukuang 1 Makassar. . This is based on the independent sample t-test obtained the value of Sig (2-tailed) 0.000 <0.05 This means that the RADEC learning model is better than the scopery learning model, while the results of the inferential analysis show that the RADEC learning model assisted by the zoom cloud meeting application has a significant effect compared to the discovery learning model on critical thinking skills and science learning outcomes for grade VI students at SDN Kalukuang 1 Makassar. . This is based on the independent sample t-test obtained the value of Sig (2-tailed) 0.000 <0.05 This means that the RADEC learning model is better than the scopery learning model, while the results of the

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Keywords:RADEC Learning Model, Zoom Application, Critical Thinking, Covid-19

PRELIMINARY

Our education is currently still in the lowest position, this can be seen from the results of a study conducted by PISA which was quoted as saying:Mustusilo (2019)in kompas.com, it is still ranked below 70 out of 78 countries in 2018. This result is made worse by the covid-19 pandemic which is currently facing the whole world and makes us unable to meet face-to-face in class so we have to implement Distance Learning (PJJ).).

The Indonesian government has taken various actions and efforts to improve the quality of education in this covid era, namely the procurement of educational facilities and infrastructure as well as the provision of quotas for Distance Learning (PJJ). what is done is not wrong, but we forget that the selection of learning models greatly affects the ability of students after learning so that students are able to answer the challenges and demands of the times.

Every country including Indonesia must be able to answer the challenges and demands of the times. The skills needed in the 21st century according toPatrick & Esther, (2015)"These skills include creativity, critical thinking and problem solving, collaborative skills, information technology skills, and new forms of literacy, and social, cultural, and metacognitive awareness". According toTriling & Fadel, (2009)"Three sets of skills most in demand in the 21st century: Learning and innovation skills, Information, media, and technology skills, Life and career skills". Meanwhile, according toKhaeruddin, et al (2013)Critical thinking skills are skills that must be developed for students to be able to be competitive in the 21st century.

Based on initial observations made by the authors at the research site, it showed that during the COVID-19 pandemic critical thinking skills, and teachers were confused about applying appropriate learning and learning models in the Covid-19 pandemic era, so teachers only applied discovery learning models in online learning by using WhatsApp. According toHanum et al (2019)Discovery Learning is a "model for developing active student learning by finding their own, investigating themselves, then the results obtained will be loyal and long-lasting in memory, not easily forgotten by students". In addition, several other subjects are still considered not optimal, student learning outcomes have indeed met the KKM of 75 but the average learning outcome is not far from the specified KKM.

According toSopandi (2019)"In the context of Indonesia, we cannot deny that the learning model which is mostly adopted from the west is not suitable to be applied in Indonesia. Not only because the students are different (literacy level, environment, etc.), innovative learning models often take a long time". So we need a learning model that is in accordance with the Indonesian context. In this study, there are at least two reasons why this study needs to be carried out, first the researchers tried to provide alternative solutions about suitable learning models to be applied and the second was to develop critical thinking skills, namely through the RADEC learning model.

Sopandi (2019)argues that "Teachers do not understand the syntax of innovative learning models, so the impact of conventional learning models remains the

mainstay of teachers. Activities in the classroom are dominated by the assignment system and rote learning shows that the low involvement of students' thinking skills in learning. There are still a lot of rote materials contained in short term memory, so that students' thinking skills in Indonesia are only at the level of remembering, restating, or referring without reciting.(Nugroho, 2018).

The RADEC learning model has characteristics in learning including: "(1) RADEC learning always encourages students to be actively involved in the learning process; (2) RADEC learning encourages students to learn independently; (3) RADEC learning always connects what students know with the material being studied; (4) RADEC learning connects the material studied with real life or contemporary issues; (5) RADEC learning always provides opportunities for students to actively ask questions, discuss, propose investigation plans, and conclude the material being studied; (6) RADEC learning provides opportunities for students to study the material in depth through pre-learning assignments"(Handayani, et al. 2019).

The syntax of the RADEC learning model is in accordance with the abbreviation of the model name itself, namely Read, Answer, Discus, Explain and Create. The RADEC model starts from the reading stage, the second stage answers, the third stage discusses, the fourth stage explains, and the sixth stage makes. Sopandi (2019) stated that "The ease of remembering and implementing the RADEC learning model is evident from previous studies which state that the steps of the RADEC model are easy to memorize and understand and can help students to build a reading culture, improve student literacy, improve understanding. students conceptual and encourage students to develop 21st century competencies"

Based on several explanations, critical thinking skills are needed by students today. The RADEC model is an alternative that can be used and is in accordance with the facts in the research field. The RADEC model was first introduced by Mr. Sopandi at an international conference in Kuala Lumpur, Malaysia. The results of other studies have also proven that the RADEC model stimulates students' critical thinking skills, namely research conducted byAdi Pratama et al (2019)This study uses a literature review.

In this era of the covid-19 pandemic, we cannot meet face to face in class and deliver subject matter directly, while in the syntax of the RADEC learning model students must discuss and explain directly, to overcome problems we must use technology as stated by(Agustin, 2011): "Technology in education has a major impact on learning outcomes. The use of technology in learning can overcome the limitations of space and time, disseminate information more widely, quickly, so that messages can be delivered according to the desired learning objectives.

The Zoom application can bring together many people in one application room, and simplify and shorten meeting time. So with this application, we can be more helpful in communicating even though we are far away, all explanations and messages can be conveyed directly without having to meet physically. The combination of the RADEC learning model assisted by the zoom cloud meeting application is very suitable because teachers and students can interact directly even though they are not in the classroom.

Based on the foregoing, a study entitled: The effect of the RADEC learning model assisted by the zoom application on the science critical thinking skills of sixth graders at SDN Kalukuang 1 Makassar.

RESEARCH METHODS

The type of research used is Quasy Experimental Design type Nonequivalent Control Group Design.

The population in this study were all fifth grade students of SD Negeri Sekompleks Kalukuang Makassar City which consisted of 4 schools with a total number of 203 students. The sampling technique in this study was random sampling, namely random sampling. The process of taking random sampling by means of a lottery where the draw is carried out twice. The first draw was to determine which school to choose and SDN Kalukuang 1 Makassar was chosen. The second draw was to determine the experimental class and

control class and the result was that class VI.A was assigned as the experimental class and class VI.B as the control class. The sample in this study were all sixth grade students of SD Negeri Kalukuang 1 Makassar which consisted of two classes totaling 56 people.

Test Instrument for critical thinking skills in the form of a description (essay) as many as 6 numbers with indicators of critical thinking skills. The following aspects of critical thinking in this study are based on:Ennis (2011) : (1) Giving a simple explanation, (2) Building basic skills, (3) Concluding, (4) Providing further explanation, (5) Setting the strategy.

Validation in this study using content validation was carried out by consulting 2 expert lecturers to become validators. Content validity is calculated using the Gregory Index formula.

The results of the agreement of the two validators whose validity level is calculated using the Grogery validity coefficient formula where the following results are obtained:

Table 1

No	Instrument	N	V	TV
1	RPP	0.9	V	Currently
2	LKPD	0.5	V	Tall
3	KBK (Pre-test)	0.8	V	Currently
4	KBK (Post Test)	0.8	V	Currently

Information:
KBK : Critical Thinking Skills
N : Score
V : Valid
TV : Validity Level

Data analysis techniques used in this study consisted of descriptive analysis techniques and infrensial analysis techniques. Description analysis aims to describe critical thinking skills. Infrensial analysis technique was used to analyze the data statistically.

The data analysis technique used to test the hypothesis was using Independent sample t-test Analysis. To determine the effect of the RADEC learning model on the science critical thinking skills of sixth graders at SDN Kalukuang 1 Makassar.

RESULTS AND DISCUSSION

A. Research result

1. Descriptive Analysis Results

a. Experimental Class Critical Thinking Skills

1) Pre Test

The following is a table regarding the initial description of critical thinking skills (Pre Test):

Table 2

Statistics	Statistical Value
Maximum score	75
Minimum score	46
Score range	29
Average (Mean)	60.82
median	63
mode	58
Standard Deviation	7.76
Variance	60.15

Based on table 2, it can be stated that the average score of critical thinking skills (Pre Test) is 60.82, standard deviation is 7.76, maximum score is 75, minimum score is 46, score range is 29, median is 63, mode is 58 and variance is 60.15. . Furthermore, the results of the analysis of critical thinking skills are grouped into four categories so that the frequency and percentage distributions are obtained as follows:

Table 3

S	K	F	%
81.25 - 100	SK	0	00.00%
62.50 - 81.24	K	9	32.14%
43.75 - 62.49	KK	19	67.86%
25.00 - 43.74	SKK	0	00.00%

Information:
S : Score
K : Category
F : Frequency
% : Percentage

SK : Very Critical
K : Critical
KK : Less Critical
SKK : Very Less Critical

Table 5 shows that of the 28 students who scored in the very less critical category 0 students (00.00%), the less critical category was 19 students (67.86%), the critical category was 9 students (32.14%) and the critical category was 9 students (32.14%). very critical 0 students (00.00%). The average score of students' critical thinking skills was converted into the four categories above, so the average critical thinking skills (Pre Test) of students were included in the less critical category, namely 60.82.

2) Post Test

The following is presented in tabular form regarding critical thinking skills (Post Test):

Table 4

Statistics	Statistical Value
Maximum score	100
Minimum score	71
Score range	29
Average (Mean)	88.36
median	88
mode	83
Standard Deviation	6.64
Variance	44.09

Based on table 4, it can be stated that the average score of students' critical thinking skills (Post Test) is 88.36, standard deviation is 6.64, maximum score is 100, minimum score is 71, score range is 29, median is 88, mode is 83 and variance is 44, 09. If critical thinking skills are grouped into four categories, the frequency and percentage distributions are obtained as follows:

Table 5

S	K	F	%
81.25 - 100	SK	18	64.29%
62.50 - 81.24	K	10	35.71%
43.75 - 62.49	KK	0	00.00%
25.00 - 43.74	SKK	0	00.00%

Table 5 shows that of the 28 students of class VI.A SDN Kalukuang 1 Makassar, students who scored in the very less critical category were 0 students (00.00%), less critical category 0 students (00.00%), critical category 10 student (35.71%), very critical category 18 students (64.29%). The average score of students' critical thinking skills was converted into the four categories above, so the average critical thinking skills (Post Test) of students were included in the very critical category, namely 88.36.

b. Control Class Critical Thinking Skills

1) Pre Test

The following is a table regarding the initial description of critical thinking skills (Pre Test):

Table 6

Statistics	Statistical Value
Maximum score	75
Minimum score	46
Score range	29
Average (Mean)	61.07
median	63
mode	54
Standard Deviation	7.60
Variance	57.77

Based on table 2 it can be stated that the average score of critical thinking skills (Pre Test) is 61.07, standard deviation 7.60, maximum score 75, minimum score 46, score range 29, median 63, mode 54 and variance 57.77 . Furthermore, the results of the analysis of critical thinking skills are grouped into four categories so that the frequency and percentage distributions are obtained as follows:

Table 7

S	K	F	%
81.25 - 100	SK	0	00.00%
62.50 - 81.24	K	15	53.57%
43.75 - 62.49	KK	12	42.86%
25.00 - 43.74	SKK	1	3.57%

Table 5 shows that students who scored in the very less critical category were 1 student (3.57%), the category of less critical 12 students (42.86%), critical category 15 students (53.57%) and very critical category 0 students (00.00%). The average score of students' critical thinking skills was converted into the four categories above, so the average critical thinking skills (Pre Test) of students were included in the less critical category, namely 61.07.

3) Post Test

The following is presented in tabular form regarding critical thinking skills (Post Test):

Table 8

Statistics	Statistical Value
Maximum score	96
Minimum score	71
Score range	25
Average (Mean)	79.75
median	79
mode	83
Standard Deviation	6.88
Variance	47.31

Based on table 4 it can be stated that the average score of students' critical thinking skills (Post Test) is 79.75, standard deviation is 6.88, maximum score is 96, minimum score is 71, score range is 25, median is 79, mode is 83 and variance is 47, 31. If critical thinking skills are grouped into four categories, the frequency and percentage distributions are obtained as follows:

Table 9

S	K	F	%
81.25 - 100	SK	13	46.43%
62.50 - 81.24	K	15	53.57%
43.75 - 62.49	KK	0	00.00%
25.00 - 43.74	SKK	0	00.00%

Table 9 shows that students who scored in the very less critical category were 0 students (00.00%), the less critical category was 0 students (00.00%), the critical category was 15 students (46.43%), the very critical category was 13 students (53.57%). The average score of students' critical thinking skills was converted into the four categories above, so the average critical thinking skills (Post Test) of students were included in the critical category, namely 79.75.

B. Discussion

When using the RADEC learning model as an experimental class, students were a little surprised by the many activities carried out in this online learning process. This is because they have never carried out learning activities such as this kind of learning during the online learning process. Usually they only do learning activities using the WhatsApp group, then they send a video and a little explanation by the teacher and then they are given assignments and there are never group activities to discuss so the teacher only does the discovery learning model because it is felt to be simpler to implement.

Teacher activities in RADEC learning areEquip students with pre-learning questions that are in accordance with the material to be studied at meetings on Zoom, Monitor and motivate students to read and do assignments (via WhatsApp), Motivate students who are successful in doing certain tasks from LKPD to provide guidance to their friends who are have not mastered it (via zoom), Ensuring what the presenter explained is scientifically correct and all students understand the explanation, Encouraging other students to ask, argue, or add to what has been presented by presenters from other groups, Explaining essential concepts that have not been fully mastered students, Guiding students to realize their creative ideas, make reports and report them.While student activities in the RADEC learning model are digging information from various sources, both books, other printed information sources and other sources of information such as the internet, Answering pre-learning questions, In groups discussing answers to questions or assignments they have done, Student representatives explain concepts essential things they have mastered in front of the class, Discuss creative thinking that they have thought independently at home, Discuss ideas to make it happen, by making

reports, so that the process stimulates students' thinking process skills, especially critical thinking, this is in line with the results of the study.In groups to discuss answers to questions or assignments they have done, student representatives explain the essential concepts they have mastered in front of the class, discuss creative thoughts that they have thought independently at home, discuss ideas to realize them, by making reports, so that the process stimulates to improve students' thinking process skills, especially critical thinking, this is in line with the results of the studyIn groups to discuss answers to questions or assignments they have done, student representatives explain the essential concepts they have mastered in front of the class, discuss creative thoughts that they have thought independently at home, discuss ideas to realize them, by making reports, so that the process stimulates to improve students' thinking process skills, especially critical thinking, this is in line with the results of the studyso that the process stimulates to improve students' thinking process skills, especially critical thinking, this is in line with the results of the studyso that the process stimulates to improve students' thinking process skills, especially critical thinking, this is in line with the results of the study(Adi Pratama et al., 2019)has proven that the RADEC model stimulates students' critical thinking skills.

Stenberg(Husnah, 2017: 12-13), mentions several efforts that can be made by teachers, namely: (1) teaching students to use correct thinking processes, (2) developing problem-solving strategies, (3) improving students' mental images, (4) broaden students' knowledge base and, (5) motivate students to use thinking skills. Meanwhile, according toZamroni & Mahfudz, (2009) there are four ways to improve critical thinking skills, namely by: "(1) certain learning models, (2) giving the task of critiquing books, (3) using stories, and, (4) using Socratic question models.

Based on the explanation above, the efforts that can be done by the teacher are: (1) Giving question after question (increasing curiosity), (2) providing opportunities for children to ask questions and express opinions, (3) giving a problem to be analyzed, (4) using innovative learning models and media.

The RADEC learning model was developed based on the following points. First, "Developing the potential of students, becoming human beings who believe and fear God Almighty, are virtuous, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens". Second, this model was developed on the basis of constructivism theory. According toVygotsky (1962)argues that "cognitive skills in children can be developed through interaction with the social environment". So in the learning process, there is a time when students need to learn independently about a concept of subject matter without being assisted by the teacher. On the basis of this theory, in the learning process the teacher must learn between these things.

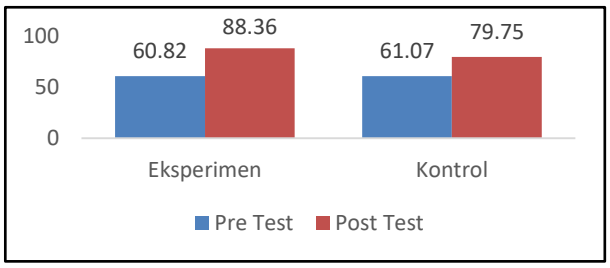
The effect of the RADEC learning model assisted by the zoom cloud meeting application on the critical thinking skills of grade VI students at SDN Kalukuang 1 Makassar, so a critical thinking skill test instrument is needed which has been declared valid and then given before treatment (Pre Test) and after treatment (Post test). The data obtained from the results of the pre-test and post-test were then analyzed by descriptive and infrensial statistical tests.

Based on data on initial critical thinking skills (Pre Test) students in both classes, namely the experimental and control classes, had a normal and homogeneous distribution, so that the parametric statistical test analysis used the independent sample t-test. The results of the analysis show the value of sig. (2-tailed) is$0.000 < 0.05$, which means that there is an effect of the RADEC learning model assisted by the Zoom application on the critical thinking skills of sixth graders at SDN Kalukuang 1 Makassar.

In the experimental class the average value of critical thinking skills (Post Test) reached 88.36 and in the control class the average value of students' critical thinking skills reached 79.75. From the results of the data analysis, it is known that the average value of critical thinking skills (Post Test) in the

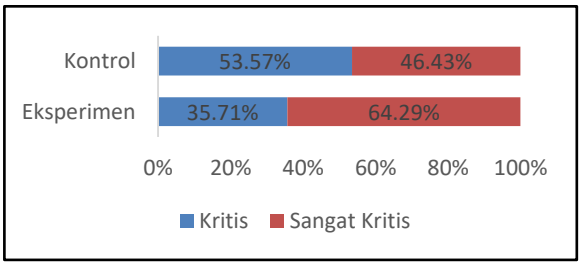
experimental class is higher than the control class. This means that the experimental class has better critical thinking skills than the control class. The following is a statistical comparison diagram of the average critical thinking skills of the experimental class and the control class:

Image 1



Critical thinking skills (Post Test) in the experimental class are grouped into four categories. From the results of the data analysis, it is known that the categorization of critical thinking skills (Post Test) in the experimental class is higher than the control class. This means that the experimental class has a better categorization of critical thinking skills than the control class. The following is a statistical comparison diagram of the categorization of critical thinking skills in the experimental class and the control class:

Figure 2



This study shows that there is an effect of the RADEC learning model assisted by the zoom cloud meeting application on the critical thinking skills of grade VI students at SDN Kalukuang 1 Makassar, because RADEC learning always encourages students to be actively involved in the learning process, independently, connecting the material studied with real life or contemporary issues, providing opportunities for students to actively ask questions, discuss, propose an investigation plan, and conclude the material being studied, provide opportunities for students to study the material in depth through pre-learning assignments.

The findings of this study are in line with the research conducted by Yoga, Sopandi, & Hidayah. 2019. With the title "RADEC (Read-Answer-Discuss-Explain and Create) learning model: The importance of building critical thinking skills in Indonesian context: This study resulted in one of the solutions to be able to build critical thinking skills is to use the RADEC learning model (read - answer-discuss-explain and create). The approach to learning taken by the teacher plays a role in growing critical thinking skills.

The syntax of the RADEC learning model encourages students to carry out various activities in learning such as reading, answering, discussing, explaining, and creating works. The learning process that allows students to carry out various activities during learning develops thinking skills and provides a sense of ownership, responsibility, and involvement in education(Zandvakili, et al, 2018). In line with this, the RADEC learning model has been proven to be able to improve conceptual mastery and develop students' explaining skills(Sopandi, 2019).

CONCLUSION

Based on the results of the research and discussion above, it can be concluded that the RADEC learning model affects the science critical thinking skills of sixth grade students at SDN Kalukuang 1 Makassar. This can be seen from the results of the descriptive analysis showing that the average critical thinking skills of the RADEC learning model is 87.14 and the discovery learning model is 80.21, while the inferential analysis also shows that the RADEC learning model assisted by the zoom application has a significant effect on thinking skills. critical science for grade VI students of SDN Kalukuang 1 Makassar. This is based on the independent sample t-test, the value of Sig (2-tailed) is 0.000 <0.05.

The following suggestions can be conveyed by researchers related to the results

of this study as follows: (1) Teachers must be more creative in choosing models and variations of learning so that learning becomes more effective, of course careful preparation, starting from planning and implementing the syntax of the RADEC learning model . Suggestions are also for teachers to ensure and educate in advance about how the RADEC learning model is, how to use the zoom application, ensuring all students have adequate devices and technology. Regarding critical thinking skills, teachers must first provide education on how to think critically. (2) To further students and researchers, especially those who are involved in the field of Education, to study more deeply about the RADEC learning model, is to conduct remote research using more sophisticated technology that allows for close monitoring related to supervision when working on research test questions. (3) The limitations and some obstacles in this research are that researchers cannot monitor closely because they do not meet directly in class, sometimes there are students who go out of zoom because the network is disconnected.

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