The Effectiveness of the RADEC Learning Model Assisted by Digital Comics Media on Students Learning Outcomes and Interest in Learning

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Abstract. This research aims to determine the effectiveness of learning science on science learning through the application of the RADEC (Read, Answer, Discuss, Explain and Create) model with the aid of digital comic media. This type of research is experimental research with a pre-experimental design and the form of research is a one-shot case study. The experimental unit in this study was 20 students of class VA SDN 264 Griya Bumi Antapani as a test class for the application of the RADEC model with the help of digital comic media which was selected using a random sampling technique. The results showed that the descriptive analysis obtained the following results: (1) The implementation of science learning was 3.87 which was in the very good category. (2) The average student learning outcome in science is 78.37 (3) The average percentage of student activity is reaching a percentage of 88% (4) The student response questionnaire shows that most students respond with a percentage of 92.5%. The results of the inferential analysis show that the students' science learning outcomes after the application of the RADEC model assisted by digital comic media are more than the Standard Minimum of Completeness or H_1 scores accepted.

Keywords: Effectiveness, RADEC, Digital Comic Media, Student Learning Outcomes, Interest in Learning.

INTRODUCTION ~ Education is a very important need for humans. Someone who has a good education will be able to compete and face any changes towards a better direction. Education about human development efforts, the success of education is very dependent on the human element. In this case, learning is needed in the educational process because a teacher can the level of students' ability to the material presented (Nursyamsi & Hatibe, 2020). Learning must also be adapted to the learning needs to achieve educational goals.

One of the issues that are regularly looked in the realm of instruction is the low understudy learning results. This is a sign of understudies' absence of comprehension of the material being instructed. (Nursyamsi & Hatibe, 2020). Some of the factors that cause students' lack of interest in learning which causes low student learning outcomes are 1) teacher learning is still teacher center because it only uses the lecture method. 2) teachers do not use innovative learning models, to foster student interest in learning. 3) the teacher does not use media in the learning process, so students feel bored and sleepy when learning takes place (Wijayanti & Liesdiani, 2020).

To make the classroom atmosphere more effective and fun so that students become more active and enthusiastic to take part in learning, it is necessary to have an innovative learning model. The assurance of the learning model utilized by the instructor incredibly upholds the accomplishment of a learning interaction since it can construct a learning climate that stands out for students and is a good time for understudies so understudies

can concentrate completely on the learning system. (Djamarah, 2002). For this reason, it is necessary to modify learning while developing the quality of teaching and learning activities as said by "Nelson Mandela" that "the change is very important so that the learning process in the classroom is of quality, given that education has great power in changing the fate of a nation. (Sopandi. 2017).

The learning model is a logical sequence to teach students (Widodo, 2021). Learning model is a calculated structure that depicts a methodical technique in getting sorted out learning encounters to accomplish specific learning destinations and fills in as an aide for learning architects and educators in arranging instructing and learning exercises (Huda, 2013). The Learning Model provides a framework and direction for teachers to teach (Trianto, 2010). One of the innovative and suitable learning models to be applied in the implementation of the 2013 curriculum is the RADEC (Read, Answer, Discuss, Explain and Create) Learning Model.

The RADEC learning model in question is the Read, Answer, Discuss, Explain and Create learning model or abbreviated as RADEC. The RADEC learning model is an adjustment and modification of the scaffolding learning method (Sopandi. 2017). The scaffolding method is based on seeking assistance, support for students from people who are more understanding/adult, especially a teacher in teaching and learning activities that allow the development of student learning abilities so that there is mastery of the material.

The RADEC learning model is also described as a learning model that can

encourage students to develop 21st-century skills and master the learning concepts being studied (Sopandi, 2019). About learning science, this learning model can help students understand the field of science, through the RADEC model, it is expected that students have the desire and exploration of various teaching materials and sources of information so that students have the knowledge and understanding as expected. (Susanti, 2019). So it should be from this learning model that science learning is not only to provide science concepts, but must be used as a vehicle for students to learn about themselves and the environment, and more importantly how to apply science in everyday life (Sujana, 2014).

In addition to learning models, one way to make the classroom atmosphere more conducive and fun, the media can also make students interested in participating in the learning process (Jatmiko & Fiantika, 2017). Learning media is utilized as a method for supporting the conveyance of material to understudies in the learning system and learning media as a device in the learning system (Arsyad, 2014). One form of science learning media in elementary schools that can foster student interest in learning is digital comic media.

Comics form a cartoon in which the characters structure a story in a grouping of firmly related pictures intended to engage the perusers (Putri, 2020). So that comics can be used to present a material to increase student interest in related material (Sudjana & Rivai, 2002). While digital comics are comics that consist of a combination of multimedia elements and limited animation so that they are in the form of moving comics (Huda N. , 2011).

In its development, digital comics have advantages compared to traditional comics, namely in terms of the maintenance period, and can contain moving images, accompanied by audio tracks or even narrated in multimedia (Putri, 2020).

Based on the background that has been stated, the RADEC learning model can improve the quality of learning and student interest. In making the RADEC learning model viable, the educator utilizes advanced funnies as a fascinating medium that can expand understudy interest in learning with the instructor proceeding to focus on the grammar of the RADEC learning model to suit the learning goals. Thus, the application of this model allows producing students who have good science learning outcomes. Therefore, researchers are motivated to research with the title "The Effectiveness of the RADEC Learning Model Assisted by Digital Comics Media on Student Learning Outcomes and Interest in Learning".

METHOD

This type of research is quantitative research with experimental research methods. Experimental research is characterized by the absence of a comparison group and randomization. The research design used in this study was pre-experimental in the form of a one-shot case study. The population in this study were all fifth-grade students at SDN 264 Griya Bumi Antapani, Bandung City, which was held in the odd semester of the 2021/2022 Academic Year. By using a random sampling technique, the sample in this study was determined, namely class VA students at SDN 264 Griya Bumi Antapani which consisted of 25 students. There are 11 male students and 14 female students.

The research instrument used a questionnaire sheet, test sheet, and observation sheet. Questionnaire sheets were used to find out about students' interest in the RADEC learning model assisted by digital comic media. After following the learning process, student learning outcomes test sheets are used to find out about student learning completeness. Student activity observation sheets are used to determine student activities in following the learning process.

Research design is a plan on how to collect data from analyzing data so that it can be done economically and by research objectives. Researchers used the one-shot case study design. Where this research design is given treatment or treatment in a group and then the results are observed (Sugiyono, 2016).

Table 1 Pre-experimental design model in the form of one-shot case study

Group	Pretest	Treatment	Posttest
Experiment	-	X	T

Information:
X: treatment (variable independent)
T: posttest

Based on table 3.1, this study only used one experimental class with no pretest. Treatment is the implementation of learning using the RADEC learning model assisted by digital comic media. While the

results reviewed are student learning outcomes through posttest.

After the data is collected, it is analyzed using descriptive statistical analysis techniques, with the following analysis:

1) Learning Implementation Analysis

The data analysis technique on the implementation of the learning model used average analysis. This means that the implementation of the learning model is calculated by adding up the value of each aspect and then dividing it by the many aspects that are assessed. The categories of implementation of learning are used the following categories:
$3,00 < $ mean score $\leq 4,00$: very implemented
$2,00 < $ mean score $\leq 3,00$: implemented
$1,00 < $ mean score $\leq 2,00$: not implemented
$0,00 < $ mean score $\leq 1,00$: not implemented

2) Data Analysis of Student Learning Outcomes,

Descriptive statistical analysis is intended to describe the characteristics of students' science learning outcomes after the application of the RADEC model assisted by digital comic media which includes: the highest value, lowest value, average value, range, median, standard deviation, maximum value, and minimum value. Besides, student learning outcomes are also directed at achieving individual and classical learning outcomes. Mastery learning can be achieved if the score obtained by students is at least by the minimum completeness criteria (KKM) determined by the school concerned, while the minimum completeness of students reaches a minimum score of 75.

3) Analysis of Student Learning Activities

The percentage of student learning activities is adapted from the following scores:
91% - 100 means that student activity is very good
81% - 90% it means good student activity
71% - 80% it means that student activity is sufficient
61% - 70% it means that student activity is not good
0% - 60% means that student activity is not good
Students are said to be active in the learning process using the RADEC learning model assisted by digital comic media if the percentage of student activity, namely the minimum score is in the good student activity category.

4) Analysis of Student Interests,

To find out the categories of student interest in learning, use guidelines adapted from (Sudijono, 2011).

Table 2 Interest score percentage (%)

Interest score percentage (%)	Criteria
100	All
76 – 99	Mostly
51 – 75	More than half
50	Half
26 – 49	Less than half
1 – 25	Small
0	No one

The RADEC Learning Model assisted by digital comic media is effective if the minimum interest score percentage is in the "mostly" category.

Analysis Inferential

Inferential statistics is a statistical technique used to analyze sample data and the results are applied to the population (Sugiyono, 2016). This technique is intended for testing research hypotheses. Before testing the research hypothesis, a normality test is first carried out as a prerequisite test

RESULTS AND DISCUSSION

Descriptive Analysis

The results obtained from this study are in the form of descriptive analysis data, as follows:

1) Description of Learning Implementation

   Data on the implementation of the learning model were obtained from observations during 3 meetings held on November 1, 3, and 4, 2021. Then followed by giving a posttest which was held on November 4, 2021. The posttest aims to determine students' ability to recognize the water cycle science material after given learning using the RADEC learning model using digital comic media. Based on the results of data analysis on the implementation of science learning through the application of the RADEC model assisted by digital comic media, the average value was 3.87. In the learning implementation criteria, the value obtained is in the interval of $3.00 < $ mean score ≤ 4.00 which means that it is in the "very good" category.

2) Description of Student Learning Outcomes

   Based on the results of descriptive analysis of students' science learning outcomes after being given treatment, it is shown in table 4.1 below:

Table 3 Study Result Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Hasil belajar	20	30.0	60.0	90.0	78.375	1.4541	6.5028
Valid N (listwise)	20						

Based on Table 4.1, it can be seen that the average score of student learning outcomes for class VA SDN 264 Griya Bumi Antapani through the application of

the RADEC Learning model assisted by digital comic media is 78.37 out of an ideal score of 100 that may be achieved by students with a standard deviation of 6.50. The lowest score obtained by students is 60 and the highest score is 90 with a score range of 30. So based on these statistics it can be said that the average score of student learning outcomes has met the minimum completeness criteria. This is by the research conducted (Ilham, 2020) which states that the RADEC learning model applied to science learning gets better learning outcomes based on the table test of betweens subject effect obtained the value of Sig. 0.016 < 0.05. in line with that (Sukmawati, Sopandi, & Sujana, 2019) in the classroom action research that was carried out, it was found that the application of RADEC in science learning activities could improve student learning outcomes.

3) Description of Student Learning Activities

Observation of student activities during learning activities using student activity observation sheets. The results of observations of student activities in science learning every time they meet for three face-to-face meetings in the learning process are expressed by the percentage.

Based on the results of student activity data analysis, showing that the percentage of student learning activities starting from the first meeting to the third meeting, which is 88%, has met the

criteria for the ideal time and when converted into the category of assessment of student learning activities, it is included in the very good category. According to research conducted by (Fahira, 2020) which shows that in general all students who receive the RADEC learning model treatment on learning activities, have carried out learning activities with very good criteria, reaching 95%.

4) Description of Student Interests

The instrument used to obtain student response data is a student response questionnaire to learning. Based on the results of the analysis of student response data, it shows that the average percentage of student responses to science learning through the application of the RADEC Learning model assisted by digital comic media is 92.5%. Thus, it is included in the "mostly" category which means that this model is very effective on students' learning interests.

Analysis Inferential

The inferential statistical analysis in this section is for testing the formulated hypotheses and before carrying out the inferential statistical analysis, the normality test is carried out first.

1) Normality Test

By using the normality test, the results of the analysis of students' science learning outcomes scores are stated in table 4.2 below:

Table 4 Table Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
hasil_belajar	.199	20	.037	.916	20	.082

a. Lilliefors Significance Correction

Based on table 4.5 the results of the analysis of student learning outcomes based on the number of samples below 50 people, the Shapiro-Wilk column is used for comparison (Raharjo, 2018). The normality test table shows that the value of Sig. in the Shapiro-Wilk column or P-$_{value}$ > α is 0,082 > 0,05. This shows that the value of students' science learning outcomes on learning outcomes is included in the normal category.

2) Hypothesis Test

Hypothesis testing was analyzed using a t-test to find out the average science learning outcomes using t-test one-sample t-test stated in table 4.3 below:

Table 5 t One-Sample Test Table

					95% Confidence Interval of the Difference	
	t	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
hasil_belajar	2.321	19	.032	3.3750	.332	6.418

Test Value = 75

Based on the results of table 4.3, shows that the calculated t value is 2,321 with 19 degrees of freedom and the value of Sig. (2-tailed) of 0.032. The value of the t table with 19 degrees of freedom and a significance level of 0.05 (5%) is 1.7. The t-count value is 2.321 > t table 1.7, so the decision to accept H1 means that the hypothesis is that the average science learning outcomes of class VA students at SDN 264 Griya Bumi Antapani after the application of the RADEC model assisted by digital comic media has been tested. This shows that statistically, the average value of students' mathematics learning outcomes is more than 75 with a Standard Minimum of Completeness = 75.

CONCLUSION

Based on the results of the analysis and discussion, the effectiveness of science learning through the RADEC learning model assisted by comics media in class VA students at SDN 264 Griya Bumi Antapani can be concluded as follows: the results of the descriptive analysis show that 1) In the criteria for implementing learning, the values obtained are in the interval 3.00 < x ≤ 4.00 which means that it is in the "very good" category. 2) Student learning outcomes have reached the minimum completeness criteria. 3) Student learning activities starting from the first meeting to the third meeting have met the criteria for ideal time with a percentage of 88% which is included in the good category. 4) the average percentage of students' interest responses in the learning model is 92.5% or in the "mostly" category. The inferential analysis shows that the students' science learning outcomes after the application of the RADEC model assisted by digital comic media are more than the Standard Minimum of Completeness or H_1 scores are accepted.

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