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Natural Science Learning Results Using the Conventional Method and the Snowball Throwing Method

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Abstract

This research was motivated by the teaching methods used by the teacher in each class meeting which were not used randomly, but had been selected according to the formulation of certain learning objectives. It is rarely seen that teachers formulate goals with only one formula, but what is certain is that teachers formulate more than one goal. Therefore, teachers always use more than one method. The aim of this study is to determine if there are variations in student science learning results by using the snowball throwing technique versus traditional approaches in fifth grade students SDN 47 in Jambi City. This research is quantitative. Data mining employs a quasi-experimental approach to elucidate the interaction between two or more variables. The results suggest that there are discrepancies in student learning outcomes, there are variations in student learning outcomes by using the snowball throwing technique versus traditional approaches.

Keywords: *Learning Outcomes; Conventional Method; Snowball Throwing Method; Science*

Introduction

The advancement of science and technology has resulted in improvements in nearly every area of life, with different challenges that can only be addressed by mastering and enhancing science and technology (SS & SE, 2013). National Education System Law No. 20 of 2003, Chapter II article 3: National education has the function of developing abilities and shaping a dignified character and civilization in order to develop the potential of students to become human beings who believe and have devotion to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and be a democratic and responsible citizen (Basri, 2008).

Improving educational standard is a natural result of healthy schooling (Sulistiani & Masrukan, 2017). Continuous modification and enhancement of the learning process is needed for good learning. Furthermore, changes in the collection of learning topics that are used to increase the standard of the learners themselves are needed. Likewise, with Natural Science lessons. Substantially, the existence of

natural science in basic education is a means of developing students' understanding of how individuals and groups live together and interact with their environment. In addition, students are guided to develop their ability to express opinions and think critically about natural phenomena that occur in the environment where students live (Yamtinah et al., 2020).

Learning model is a plan or a learning pattern that is used as a guide for planning learning in the classroom. The learning model is like a wrapper or frame from the application of an approach, strategy, method, technique, and learning strategy. While the learning model of snowball throwing "rolling snowballs" is a learning model by using question balls from paper that are rolled round in the shape of a ball and then thrown in turns among fellow group members in principle, this model combines communicative, integrative and process skills approaches. (Mursid et al., 2021).

However, until now this goal has not been maximally achieved. One of the contributing factors is that science subjects are considered to be limited to containing material in the form of facts, concepts, and principles. Students are considered achievers and the goal of science education is considered successful when students memorize and are able to answer questions about existing facts. However, the emphasis on the application of these concepts in student life is still minimal by the teacher. This assumption causes teachers to prefer to use conventional learning. This learning uses an expository approach, namely by using the lecture method and the imposition method. Teaching with the imposition method is teaching by putting things that are important by the teacher for students (Suardi, 2018).

Cooperative learning is not just an activity that groups students into groups and assigns them group assignments. A learning activity becomes cooperative learning when the learning environment provided is also oriented towards mutually supportive activities between one student and another so that together they grow in giving meaning to a phenomenon being studied (Md. Puspa Dewi, I Kt. Adnyana Putra, 2017).

This method does not consider whether the learning material provided is appropriate or not with the abilities, needs, interests and level of ability or development and understanding of students. Nor does it pay attention to whether the material given is based on the motives and goals that exist within the student. As a result, the current science subjects are less able to develop critical thinking skills, creatively, and the ability to learn independently. Learning only emphasizes the cognitive aspects alone so that students tend to be passive when taking lessons in class. This passive tendency is caused by the absence of motivation in students and also because of the feeling of boredom due to the lecture method (Malik, 2015).

Learning outcomes indicate success in achieving learning objectives. Learning outcomes describe various abilities that students gain after participating in learning. The purpose of learning in schools is to lay the foundation for intelligence, knowledge, personality, noble character, and skills to live independently and attend further education (Heryati, 2021).

In order for the learning materials delivered by the teacher to be completely mastered by students, a quality teaching and learning process becomes something important. The position of students is the central point of the learning process. Students must be seen as subjects and objects of education. This causes the learning process to be experienced by every student. Learning does not only emphasize what is learned, but also emphasizes the activeness of students in obtaining information (Malik, 2015).

Cooperative learning (cooperative learning) is a democratization of learning that adopts the concept of gotong royong. Cooperative learning is a teaching system that provides opportunities for students to work together with fellow students in structured tasks. Cooperative learning is known as group learning. But cooperative learning is more than just group learning or group work because in cooperative learning there is a cooperative structure or task that allows open interaction and effective interdependence among group members. Such a working relationship allows for a positive perception of what students can

do to achieve successful learning based on their individual abilities and the contribution of other group members during group learning. (Brata Tapa, 2021).

Another effect is the emergence of learning motivation from within students, because students have a big role in learning, not only as recipients but as active actors. With the existence of high student motivation to learn is expected to improve student learning outcomes and achievement.

The teaching method that the teacher uses in every class meeting is not randomly used, but has gone through a selection that is in accordance with the formulation of specific instructional goals. It is rarely seen that the teacher formulates goals with only one formula, but surely the teacher formulates more than one goal. Therefore, teachers always use more than one method. The use of one method is used to achieve one goal, while the use of another method is also used to achieve another goal. That is how it is, in accordance with the will of the teaching objectives that have been formulated.

Research Methods

This study is a field study that employs a quasi experimental approach to elucidate the interaction between two or more variables in order to assess the influence of one variable on other variables. In this experimental study, the researcher proposes a hypothesis or more which states the nature of the expected variable relationship. Simple experimental research contains three main characteristics, namely: (1) the existence of manipulated independent variables, (2) the existence of control/control of all independent variables, (3) the existence of observations of the dependent variable as the effect of the independent variable (Nana Sudjana, 2010).

Experimental research is the only research method that can truly test hypotheses about causal relationships. Furthermore, Gay said that the experimental method can represent the most valid approach in solving problems, both practically and theoretically (Ayu et al., 2021). In this study, the participants were split into two experimental groups that used the snowball throwing technique and a control group that used traditional methods. The Nonequivalent control group posstest testing design was used in this analysis. It's just that this design the experimental and control groups were not chosen randomly (Sugiyono, 2019).

Table 1. Nonequivalent Control Group Posttest Design

Group	Treatment (X)	Final test
Eksperimen	X	T_1
Control	-	T_1

Information:

T_1 : *Experimental class posttest*
T_2 : *Posttest control class*
X : Science learning uses Snowball Throwing method
\- : Science learning uses conventional methods

Population is all data that concerns us within an unspecified scope and time. So population is related to data. If every human being provides data, then the number or size of the population will be the same as the number of humans. Another concept of population is all scientific subjects consisting of individuals, objects, organisms, plants, symptoms, test scores, or incidents as data points with specific characteristics in a sample (S. Suhartini and Ahmad 2018). The research sample is a part or representative of the population under study (Haqiyah & Riyadi, 2018).

Observation is a technique or method of gathering information through monitoring current events (Sukmadinata, 2005). The level of achievement during the learning process can be measured by observation, whether it is teacher or student activity, such as student behavior during learning, teacher behavior during teaching, student discussion activities. Through observation, it can be seen how the attitudes and behavior of students, the activities they carry out, the level of participation in an activity, the process of carrying out their abilities and even the results obtained from their activities.

An instrument in the form of a test can be used to measure basic abilities and achievement or achievement. The experiments in this analysis were pre-test and post-test. The aim of the pre-test was to assess the students' starting abilities. While the post-test is used to determine student learning outcomes after experimental research is carried out.

The data were taken from the class teacher, namely in the student grade book. The researcher will see how the students' grades during the teaching and learning period and the outcomes of the class teacher's assessment are affected by this data. Reporting process involves gathering information about items in the form of notes, transcripts, journals and magazines (Afandi, 2013).

Examine the Instrument's Validity and Reliability. This validity test is concerned with the suitability testing instrument with the definition being evaluated in order to ensure that it actually tests what should be tested. Testing the validity of the questions in this study using the product moment formula (Matondang, 2009). Testing the validity of this question will be tested on students of class VB with a total of 30 questions after the questions are tested there are valid questions.

With a significant level of 5%, if the calculation results show rcount > rtable, it is said that the item number is significant or valid. If rcount <rtabel, it is said that the item is insignificant or invalid (Suhartini, 2011). While data processing for the purposes of validity and reliability testing was carried out with the help of the SPSS 17.0 program computer. The results of the validity test of 30 items obtained 20 valid items and 10 were invalid with the following explanation:

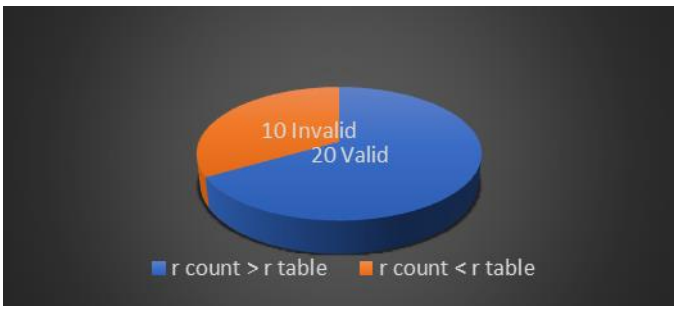

Figure 1. Test Results of the Validity of Test Items

Invalid items were aborted because they could not be used in data collection, so the test questions in this study amounted to 20 questions.

Instrument reliability is the accuracy of the evaluation tool in measuring. A test can be said to have a high level of confidence if the test can provide consistent results. To calculate the reliability of the test using the Cronbach alpha formula, which is as follows (Noor, 2017):

$$r\ 11 = \left(\frac{n}{n-1}\right)\left(1 - \frac{\sum \alpha^2}{\alpha^2}\right)$$

Where is the formula $\alpha^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n}$

Information:
$r11$ = reliability sought.
$\sum \times_{1^2}$ = the number of score variants of each item.
$\alpha 1^2$ = the total variance.

Testing the reliability of the test instrument was carried out by using Alpha Cronbach's technique using the SPSS 17.0 computer assistance from the 20 valid item items, the reliability was calculated, the reliability coefficient was obtained as in the following table:

Table 2
Case Processing Summary

Cases		
Valid	*Excluded*[a]	*Total*
20 (N)	0 (N)	20 (N)
100.0 (%)	.0 (%)	100.0 (%)

Table 3
Reliability Statistics

Cronbach's Alpha	*N of Items*
.640	20

Based on the table above, it can be seen that the instrument arranged is reliable and can be used to obtain data on student learning outcomes, the calculation results obtained are 0.640 greater than the r table, so this instrument is declared reliable.

Data Analysis Technique; Before the authors use parametric statistical techniques, the normality of the data must be tested first. If the data is not normal, then it uses nonparametric statistics. Testing data normality using Chi-Square (x^2).

In the data analysis of this study, data normality testing used the SPSS 17.0 program. To establish normality, the following criteria apply:

a. Set the level of significance, a = 0,05 ,
b. Compare p with the significance level obtained,
c. If significance is obtained > a, then the sample comes from a normally distributed population, and
d. If the significance obtained is <a, then the sample does not come from a normally distributed population.

The homogeneity test is intended to show that two or more groups of sample data come from populations that have the same variance. The homogeneity test in this study uses the help of the SPSS 17.0 program.

For research purposes only the output of the test of homogeneity of varience was used, while other data outputs were not used. Furthermore, the output data is interpreted by selecting one of the statistics, namely statistics based on the average (Based of Mean). The hypothesis being tested is:

H1: the variance in each group is the same (homogen)

Ho: the variance in each group is not the same (not homogen)

To determine homogeneity, the following guidelines are used: Set the level of significance of the test, a = 0.05 comparison of *p* with the significance level obtained significance > a, then the variance of each sample is the same. If the obtained variance < a, then the variance of each sample is not the same (Ritonga, 2020).

Data Analysis. To analyze the data using the parametric variance t-test. The formula in question is as follows:

$$t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Information:

$\overline{x_1}$ = 1st sample mean
$\overline{x_1}$ = 2st sample mean
n_1 &n_2 = Number of samples
s_1^2 = 1st sample variance

As for using the analysis program SPSS 17.0 with the following steps:

a. Open the SPSS statistical program that is already installed on the computer, then enter A and B in the view variable.
b. Enter the research data in the appropriate column in the data view.
c. Select the menu *Analyze → Compare Mean → Paired Sampel t-Test.*
d. Move the X and Y variables to the appropriate columns on the Paired Sample t-Test dialog box then select OK.

Decision rule; Calculations using the SPSS 17.0 statistical program are seen as the p value (probability) indicated by the sig (2-tailed) value. By decision rule, if the value is sig. > 0.05, then Ho is accepted, vice versa if the value is sig. <0.05 then Ho is rejected (Sri Rahayu and Andri 2010).

Research Result

In this study, the writer acted as an observer. Activities carried out at the planning stage of this research are preparing a syllabus, a Learning Implementation Plan (RPP), making assessment guidelines, preparing material in accordance with the competencies to be taught, making learning media and student worksheets (LKS).

In this quasi-experimental learning, the snowball throwing method was applied to the fifth-grade student's SD Negeri 47 Jambi City, totaling 30 students, which was carried out for two hours of lessons with a time allocation of 2 x 35 minutes (90 minutes). The initial activities of learning using SD Negeri 47 Jambi City in the classroom began with preparing lessons as usual, the teacher made apperceptions and assigned students to express their opinions. The purpose of this activity is to generate ideas from students. After this is done the students compile several questions to the answers they want to know on the question sheets that the teacher distributes, so that the reading objectives are formed from these questions. Its purpose is to arouse students' curiosity. After completion, students are required to answer the questions previously formulated by the teacher through activities on how to read the material. The answers are then

compiled into a reading summary to be recounted and conveyed by the students in front of the class. After these activities are completed, the teacher and students confirm the learning results that have been taking place and provide reinforcement to students.

At the time of giving the treatment using the snowball throwing method, the researcher made observations about the teacher's activities and student activities during the learning process. This observation aims to determine whether learning is in accordance with the steps that have been planned or not. In this study, researchers were assisted by class teachers.

Based on the data above, the results of observing the activities of the teacher, namely the researcher who implements the snowball throwing method by one teacher, shows that the teacher can really play a good role in everything by using the snowball throwing method. The results of observations on student activities in the application of the snowball throwing method in Islamic Education lessons went well.

Data normality testing is intended to determine that research comes from data that is normally distributed. The normal criteria are met if the test results are significant for a significance level of 0.05. If the significance obtained is greater than 0.05 (sig> 0.05), then the data is normally distributed. Meanwhile, if the significance obtained is sig <0.05, then the research data is not normal (Apriani & Wangid, 2015). It can be seen that the significance value of each variable is greater than the value of 0.05. As for the significance value obtained is greater than 0.05, it can be concluded that the data tested is normally distributed.

The homogeneity test is intended to show that two or more groups of sample data come from populations that have the same variance. The homogeneity test criteria are met if the test results are significant for the 0.05 significance level. if the obtained significance is greater (>) , then the variance of each sample is the same or homogeneous. Meanwhile, if the obtained significance is smaller (<), then the variance of each sample is not the same or not homogeneous. It can be seen that the significance value of each variable is greater than the value of 0.05. As for the significance value obtained is greater than 0.05, it can be concluded that the data being tested will be that variance of each sample is the same or homogeneous.

After the normality test and the homogeneity of variance test, the results of the data are normally distributed so that the variance is the same or homogeneous. T-test is used to determine whether there is a difference in student learning outcomes in science subjects using the snowball throwing method and conventional methods in fifth grade students of SDN 47 Jambi City. The statistical hypothesis tested in this study is:

Ho : There is no significant difference in student learning outcomes in science subjects using the snowball throwing method and conventional methods for fifth grade students of SDN 47 Jambi City.

Ha : There is a significant difference in student learning outcomes in science subjects using the snowball throwing method and conventional methods in grade V SDN 47 Jambi City.

If sig > 0.05 is obtained, then Ha is rejected and Ho is accepted, meaning that there is no difference in student learning outcomes when using the snowball throwing method and conventional methods in class V SDN 47 Jambi City. Conversely, if the sig value < 0.05 then Ha is accepted and Ho is rejected, which means that there are differences in student learning outcomes in science subjects in class V SDN 47 Jambi City. Based on the results of the t-test data shows that the significance value obtained is 0.00 (sig < 0.05). Thus it is stated that Ha is accepted and H0 is rejected, which means that there are

differences in student learning outcomes in science subjects when applying the snowball throwing method and conventional methods in class V SDN 47 Jambi City.

Discussion

Based on the study findings and evidence from the review, it is clear that there are variations in student learning outcomes by using the snowball throwing technique versus traditional approaches in fifth grade students at SDN 47 Jambi City. The application made in the snowball throwing method, namely the method of presenting learning material where students are formed into several heterogeneous groups then each group is selected by the group leader to get an assignment from the teacher then each student makes a ball-shaped question then throws it at other students. where each student answers the questions from the balls they get.

This is because the Snowball Throwing cooperative learning model has several advantages, namely: 1) Improving the leadership spirit of students because there is a leader in the group who is given the task of explaining the material to his friends. 2) Train students to learn independently because each student is given the task of making one question and then the question will be thrown to his friends and answered by the student who gets the question. 3) Cultivate creativity and mindset when students study because they make questions or answer questions from their friends. 4) The learning atmosphere is more fun because students like to play by throwing paper balls containing questions for students who get the paper ball. 5) Students are actively involved in learning (, et al., 2021). How to apply the Snowball Throwing learning model and rolling ball game media, researchers prepared an instrument in the form of an interview question sheet that was given when the experimental activity was completed (Ancho, 2020).

In addition to using the interview sheet, the researchers also made observations when the treatment took place in the experimental class, before the treatment the researchers prepared several learning tools such as syllabus, lesson plans, and also pretest-postets sheets in order to measure differences in student learning outcomes, learning tools could be observed. In addition, the steps that can be observed in the activities in the experimental class then the researchers note the aspects that can be observed. Through the results of observations made by researchers, several results can be drawn, namely the teacher is able to apply the Snowball Throwing learning model with Rolling Ball Game media well, the teacher is able to carry out learning steps with online learning activities (Chaves, 2021).

The results showed that the value of the learning outcomes of students in class VB as the control class in SDN 47 Jambi City was 69.66, while the value of the students' learning outcomes in class V A as the experimental class was 76.16. From these two average values, it can be seen that there is a significant difference, namely the value of the control class using conventional methods and the experimental class after learning science using the Snowball throwing method is higher if the value of the control class is higher. Results of the t-test (sig < 0.05) can be stated that there are differences in the learning outcomes of fifth grade students in science subjects when using the snowball throwing method and conventional methods at SDN 47 Jambi City. Because before the Snowball Throwing cooperative learning model was applied, students paid less attention to the teacher's explanation when explaining. Students are less active during the learning process. In addition, the teacher does not involve students during the learning process and pays less attention to whether students are bored or not while studying, so that the impact on student learning outcomes is still relatively low. while after the application of the Snowball Throwing cooperative learning model in the experimental class the learning process is more active and fosters students' enthusiasm for learning (De Catalina, 2021).

Thus, based on the comparison of learning outcomes and improving student learning outcomes above, it shows that the advantages of the snowball throwing method can be applied in science learning as

explained by Suprijono that the snowball throwing method has advantages and disadvantages. The advantages found in the implementation of learning the snowball throwing method include (Syahputra, 2020): 1) improve students' willingness to formulate questions based on the content being learned and to share experience; 2) students gain a greater understanding and a deeper understanding of the subject matter being learned. This is due to the fact that students receive explanations from peers that have been specially trained by the instructor and mobilize vision, seeing, learning, and communicating about the content covered in the community; 3) will inspire students to ask questions of their peers and instructors; 4) students should be taught how to respond appropriately to questions asked by their peers; 5) encourage students to raise questions about the subject being covered in the lecture; 6) can help students overcome their apprehension about approaching their peers and teachers for help; 7) students can have a greater understanding of what it is to work together to solve problems; 8) students will learn what it is to be responsible; 9) students will be more open to the diversity or heterogeneity of race, social class, history, skills, and intellect; 10) students may be inspired to develop their skills (Arya Wiradnyana et al., 2020). Students in the experimental class are taught using the Snowball Throwing cooperative learning model and students in the control class are taught using the conventional learning model (Hagonob, et al., 2021).

The position of the method in learning is very important, this is because the learning method can increase student learning motivation as explained by Syaiful Bahsi Djamarah that as a component of teaching, the method plays a role that is no less important than other components in teaching and learning activities. There is no teaching and learning activity that does not use teaching methods. This means that the teacher really understands the position of the method as an extrinsic motivational tool in teaching and learning activities. Extrinsic motivations are motives that are active and function, due to external stimuli. Therefore, the method serves as an external stimulant that can arouse one's learning.

Conclusion

Based on the research that has been done above, it can be concluded that there are differences in student learning outcomes in science subjects using the snowball throwing method and conventional methods in grade V SDN 47 Jambi City. This can be seen from the results of the analysis using SPSS V17.0, the results of the t-test value were obtained (sig < 0.05). Thus there are differences in student learning outcomes in science subjects. The teachers should use learning methods that can improve student learning outcomes, the principal should provide motivation and encouragement to teachers to motivate learning by using innovative learning methods.

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