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Increasing Student's Motivation and Learning Outcomes Science Lessons Through the Guided Inquiry Learning Model

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Abstract

This study aims to improve the motivation and learning outcomes of fifth graders at SDN Biro through the application of Guided Inquiry learning. This research is a Classroom Action Research conducted in 2 cycles. The research subjects were students of SDN Biro Palu class V totaling 20 people. Consisting of 6 male and 14 famale. The results of the pre-action analysis showed that the percentage of completeness of student learning outcomes was 25%. After the application of the guided inquiry model in science lessons, an increase in student motivation and learning outcomes was obtained. Student learning motivation in cycle 1 is 78.25%. In cycle 2 it increased to 85.70%. Completeness of learning outcomes in cycle 1 is 40%. In cycle 2, it increased to 80% of the students obtained classical completeness scores. The acquisition of learning outcomes in cycle 2 has met the minimum completeness criteria (KKM). The acquisition of student learning outcomes and student motivation increased in cycle 2. This increase was caused by the application of the guided inquiry model in science learning. So it can be concluded that the guided inquiry learning model is able to increase the motivation and learning outcomes of students in science subjects.

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Introduction

The science learning program in the 2013 curriculum has the aim of fostering and preparing students to be responsive to their environment. Advances in science and technology (IPTEK) demand the ability of elementary school students in the field of science to continue studying at higher schools to develop talents and interests, train skills, students to think critically, creatively, and innovatively in order to be able to compete with the outside world so that learning Science can be used as initial learning for elementary school students to think critically, creatively and innovatively and to develop creativity and individual student interest in the universe (Widani et al., 2019).

Based on the identification of the condition of the fifth grade students of SDN Biro, it was found that there was low motivation in learning. If these problems continue to be ignored, it will affect the achievement of student learning outcomes, therefore an innovative learning model is needed to increase motivation as well as learning outcomes which is a series of activities that involve maximally all students' abilities to search and investigate systematically, critically and logically so that they can find their own knowledge, attitudes, and skills as a form of behavior change (Nurhayati et al., 2019).

One of the models referred to above is a guided inquiry learning model. Science learning based on the guided inquiry model is a student-centered learning strategy in which groups of students are faced with a problem or seek answers to questions through a clearly planned procedure. Students work actively with their groups to find solutions to problems or questions given by the teacher, either through observation or experiment. So that it will be able to help students understand a concept through a scientific work process that can foster habits of thinking and acting to reflect the mastery of knowledge, skills, and scientific attitudes possessed by students.

Based on this description, the writer intends to conduct classroom action research with the aim of increasing student motivation and learning outcomes through the application of a guided inquiry model in science learning for class V SDN BIRO.

Guided Inquiry Learning Model

According to Aribawati et al., (2018) mentions the Guided Inquiry learning model is a learning model that places students more on their own to find scientific concepts and principles and

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develop creativity in problem solving, which in practice is still guided by the teacher.

According to Wulandari (2016) the inquiry learning model is a series of learning that involves maximally all students' abilities to search and investigate critically so that they can formulate their own findings confidently. In learning in elementary schools, a teacher is tasked with guiding students in learning. Thus, there is a need for guidance in the student discovery process.

From the above understanding, it can be concluded that guided inquiry learning model is a learning model that actively involves students to seek and find their own scientific concepts and principles to develop creativity in problem solving based on facts seen from the environment.

Guided inquiry learning is a series of learning activities that maximally involve all students' abilities to search and investigate systematically, critically, and logically so that they can determine their own knowledge, attitudes and skills as a form of behavior change (Nurhayati et al., 2019).

The guided inquiry model can encourage students to actively explore their own knowledge so that students can become independent, active, and skilled in solving problems based on the information and knowledge obtained. Physical and mental activities of students in guided inquiry learning activities can improve students' cognitive learning outcomes (Amijaya et al., 2018).

Guided inquiry learning model can improve students' critical thinking skills. Students who are given the opportunity to first guess what will happen, prove the assumptions put forward through experimental activities with the group, communicate with each other the experimental results obtained by each group, solve problems by deciding the experimental results that are relevant to the proposed problem. resulting in students' critical thinking skills can be increased (Nur'Azizah et al., 2016).

The steps of inquiry learning according to Wulandari (2016) and Mardiana et al., (2019) include: (a) orientation stage, (b) problem formulation stage, (c) hypothesis formulation stage, (d) data collection stage, (e) the stage of testing the hypothesis and (f) the stage of formulating conclusions.

Motivation to learn

The word "motive" is defined as an effort that encourages someone to do something. Motives are said to be the driving force from within the subject to carry out certain activities in order to achieve a goal (Sardiman, 2018). According to (Sardiman, 2018) motivation is a change in the energy of a person who is characterized by the emergence of "feeling" and is preceded by a response to the existence of a goal.

Motivation is one of the factors that determine the effectiveness and success of learning, because students will study seriously if they have higher motivation. Thus, a student will learn well if there is a motivating factor (motivation), both from within and from outside (Fauziah et al., 2017).

In teaching and learning activities students must always be given encouragement to do the work that should be done, namely learning, so students need to be given incentives to grow motivation in themselves or given motivation to continue learning. Motivation is something that can move someone or stimulate someone to do something marked by the emergence of "feeling" in order to achieve a goal.

There are several forms and ways to foster motivation in learning activities at school according to Sardiman (2018), namely: (a) giving points, (b) prizes, (c) competition or competition, (d) ego-involvement, (e) giving tests., (f) knowing the results, (g) punishment, (h) desire to learn, (i) interest, and (j) recognized goals. According to Kompri in Sardiman (2018) there are a number of indicators to determine students who have learning motivation in the learning process including: Having high passion, full of enthusiasm, having high curiosity, being able to "walk alone" when the teacher asks students to read something, have self-confidence, have high concentration, difficulties are considered as challenges that must be overcome, have patience and high fighting power.

Learning outcomes

According to Widani et al., (2019) learning outcomes are abilities, attitudes and skills obtained from students after receiving treatment given by the teacher so that they can construct that knowledge in daily activities. Widani et al., (2019), while according Aribawati et al., (2018) states that learning outcomes are results obtained as a result of an activity carried out and result in changes in behavior. Putra et al., (2014) argue that learning outcomes are changes in overall behavior carried out by observing, imitating, trying, listening, following instructions and directions consisting of cognitive, affective, and psychomotor elements to achieve learning objectives.

From the expert opinion, it can be concluded that learning outcomes are learning outcomes that are abilities obtained by students as a result of an activity that results in changes in behavior.

According to Putra et al., (2014) states that in general, learning outcomes can be divided into three,

namely the cognitive domain, affective domain, and psychomotor domain.

Materials and Method

This research is a classroom action research that aims to determine the increase in motivation and learning outcomes of science taught by guided inquiry learning model using Kemmis and Mc. Taggart which consists of planning, action, observation, and reflection. The four stages are elements to form a cycle, namely one successive round that returns to the original step or a repeating cycle (Pratiwi, et al. 2021).

The data collection instruments used in this study were motivation questionnaires, student learning outcomes, student observation sheets, and teacher skills observation sheets.

The data obtained from the observation of motivation and learning outcomes were then analyzed using quantitative descriptive analysis. In quantitative descriptive analysis, it is carried out by comparing the results of the pre-cycle, the results of cycle 1 and the results of cycle 2. The results of each cycle are then compared with performance indicators, as a standard of success in research (Suhariningsih N., 2021).

Student learning outcomes are measured by referring to the minimum completeness criteria (KKM) that have been set by the school. The KKM value is as shown in Table 2 below.

Table 1. Minimum Completeness Criteria for Students.

Interval	Category
≥ 70	Complete
< 70	Not finished

The data obtained after the evaluation was then analyzed to determine the value of science learning outcomes obtained by students using the formula according to Nurhayati et al., (2019).

$$Value = \frac{obtained\ score}{maximun\ score}\ x\ 100 \qquad (1)$$

Analysis of the results of observations on teacher activities and student activities is carried out by calculating the average frequency and percentage of each activity item at each meeting through quantitative descriptive analysis with the following formula:

: Jumlah peserta didik

$$P = \frac{F}{N}\ x\ 100 \qquad (2)$$

Information:
P: the percentage of each aspect observed
F : Frequency
N : Number of students

The results obtained from teacher and student activities are then categorized based on table 3 below.

Table 2. Categorization of teacher and student activities.

No	Interval	Category
1	> 80	Very active
2	60 – 79	Active
3	40 – 59	Active enough
4	20 – 39	Not enough
5	< 20	Not active

Science learning using a guided inquiry learning model can increase motivation and learning outcomes in science lessons for class V SDN BIRO with the indicators of the success of this research as follows:

1. Students' learning motivation by using guided inquiry learning increases with the criteria of at least obtaining a high category.
2. Student learning outcomes increase if students achieve individual KKM scores 70 and classical completeness 70%
3. Active The activities of students and teachers increase if the score is at least in the active category.

Results and Discussion

Research result

Pre Action

At the pre-action stage students are taught learning materials through the question and answer lecture method and assignments. Learning is carried out teacher-centered. After the subject matter is delivered, the teacher provides an evaluation of the material being taught. The pre-action learning outcomes obtained are still very low, namely the classical absorption only reaches 51.50% below the KKM standard (70) which has been set by the school. The results of the pre-action analysis can be seen in Table 4.

Table 3. Analysis of pre-action results.

No	Interval	Results
1	Highest score	80
2	Lowest score	20
3	Many students have completed	5
4	Many students do not finish	15
5	Percentage of students completed	25%
6	Percentage of students do not finish	75%
7	Average learning outcomes	51,50%

Based on the table above, it can be illustrated that the results of the pre-action analysis were from 20 students with the highest score of 80 with the lowest score of 20. Students who completed 5 students with a percentage of completeness 25% and students who did not complete were 15 students with a percentage of 75%. So that the percentage of classical absorption achieved is 51.50%, this achievement has not reached the Minimum Completeness Criteria (KKM).

Cycle Action 1

Action planning is carried out by preparing material on theme 2, compiling RPP and LKPD,

compiling motivation questionnaires, teacher activities and student learning activities and their indicators, compiling evaluation tests and preparing tools and materials.

Implementation of cycle 1 on heat transfer material by convection. The learning model used is Guided Inquiry learning model.

Observations or observations are made during the implementation of the action and after the implementation of the action. Observations of activities include planning for learning motivation, student learning outcomes, teacher activities and student activities.

Based on the results of observations in cycle 1, the following data were obtained.

1) Student learning motivation

Table 4. Results of student learning motivation cycle 1.

No	Interval	Number of students	Percentage (%)	Category
1	87 – 100	2	10	Very high
2	72 – 86	16	80	Tall
3	56 – 71	2	10	Enough
4	41 – 55	0	0	Low
5	25 – 40	0	0	Very low
	Amount	20	100	

Table 5 shows that students who get very high criteria are 2 students or 10%, students who get high criteria are 16 students or 80%, students who get sufficient criteria are 2 students or 10%, students who get low and very low criteria there isn't any. Student learning motivation in cycle 1 shows that students have 78.25% motivation in the high category.

2) Student learning outcomes

The results of the evaluation of student learning in cycle 1 obtained the following data.

Tabel 5. Student learning outcomes cycle 1

No	Interval	Result
1	Highest score	86
2	Lowest score	40
3	Many students have completed	8
4	Many students do not finish	12
5	Percentage of students completed	40%
6	Percentage of students do not finish	60%
7	Average learning outcomes	61,45%

Based on the table above, it can be illustrated that the highest score is 86, the lowest score is 40. Students who complete are 8 students or 40% and students who do not complete are 12 students or 60%. The classical absorption achieved is 61.45%. these achievements have not reached the Minimum Completeness Criteria (KKM) which is 70.

3) Teacher activities

The results of observations of teacher activities obtained a score of 85 with active criteria. Nevertheless, teachers need to improve the quality of their teaching based on the learning sequence that has been designed. In the next cycle, the teacher will correct the deficiencies made in cycle 1.

4) Student activities

The results of observing student activities obtained an average score of 74.40 in the active category.

Reflection is the last stage in CAR. The results of the reflection in cycle 1 are when the implementation of learning takes place the teacher makes apperception still uses language or sentences that are difficult for students to understand so that there are some questions that can not be answered by students. At the beginning of learning the teacher does not explain in a coherent and systematic manner the main points of activities that will be carried out in the learning process. When carrying out experimental activities the teacher does not explain the steps in conducting experiments. Students are only asked to read the experimental steps in the LKPD.

At the end of the lesson the teacher did not give students the opportunity to read the results of data collection so that students did not understand the correct and relevant information based on the facts that occurred. Through learning activities during cycle 1, basically the teacher has tried to carry out his duties well, but not yet perfect when learning takes place using the guided inquiry learning model.

Weaknesses found in teachers during learning in cycle 1 can be corrected in cycle 2. Several improvement solutions to be implemented in cycle 2 are as follows.

1. The teacher uses language or words that are easily understood by students.
2. The teacher conveys the main activities in a coherent and systematic way.
3. The teacher gives examples of phenomena that have been experienced by students so that they are easy to understand.
4. During learning, the teacher can motivate students to arouse curiosity about the problems and phenomena that occur.
5. Before doing the experiment the teacher explained the steps to be taken.
6. To determine relevant data, the teacher provides opportunities for students to read the results of data collection and provides reinforcement about the information students get.

Pada akhir pembelajaran guru tidak memberikan kesempatan kepada siswa untuk membacakan hasil pengumpulan data sehingga siswa belum memahami informasi yang tepat dan relevan berdasarkan fakta yang terjadi. Melalui aktivitas

Cycle Action2

The implementation of cycle 2 is not much different from the implementation of cycle 1. Some things that were considered lacking in cycle 1 were corrected in cycle 2 and adjusted to the changes achieved.

Action planning is carried out by preparing materials on theme 8, namely heat and friendly

environment, compiling RPP and LKPD, compiling motivation questionnaires, teacher activities and student learning activities and their indicators, compiling evaluation tests and preparing tools and materials.

Implementation of cycle 2 on the groundwater cycle material. The learning model used is Guided Inquiry learning model.

Observations are made during the implementation of the action and after the implementation of the action. Observations of activities include planning for learning motivation, student learning outcomes, teacher activities and student activities.

Based on the results of observations in cycle 2, the following data were obtained.

1) Student learning motivation

Tabel 6. Results of student learning motivation cycle 2.

No	Interval	Number of students	Percentage (%)	Category
1	87 – 100	9	45	Very high
2	72 – 86	11	55	Tall
3	56 – 71	0	0	Enough
4	41 – 55	0	0	Low
5	25 – 40	0	0	Very low
	Amount	20	100	

Table 7 shows that students who obtained very high criteria were 9 students or 45%, students who obtained high criteria were 11 students or 55%, and there were no students with sufficient, low and very low categories. Student learning motivation in cycle 2 shows that students have a motivation of 85.70% with a very high category.

2) Student learning outcomes

The results of the evaluation of student learning in cycle 2 obtained the following data.

Tabel 7. Student learning outcomes cycle2.

No	Interval	Result
1	Highest score	100
2	Lowest score	53
3	Many students have completed	16
4	Many students do not finish	4
5	Percentage of students completed	80%
6	Percentage of students do not finish	20%
7	Average learning outcomes	71,80%

Based on the table above, it can be illustrated that the highest score is 100, the lowest score is 53. Students who complete are 16 students or 80% and students who do not complete are 4 students or 20%. The classical absorption achieved is 71.80%. This achievement has reached the Minimum Completeness Criteria (KKM) which is 70.

3) Teacher activities

Hasil observasi aktivitas guru diperoleh nilai 100 dengan kriteria sangat aktif. Hal ini menunjukan bahwa aktivitas guru dalam pembelajaran dengan menerapkan model pembelajaran inkuiri terbimbing sudah sangat baik, namun terus ditingkatkan lagi.

4) Student activities

The results of observing student activities obtained an average score of 87.70 in the active category.

The reflection of the second cycle of class action was improved by conducting a Guided Inquiry model learning to increase the motivation and learning outcomes of fifth graders at SDN Biro in accordance with the results of the study, it can be explained as follows:

1. Data on student learning motivation in cycle 2 is 86.05% with a very high category. This is because students begin to enjoy and understand learning through the guided inquiry model. In addition, students have the courage to read the results of their learning in front of the class with enthusiasm and confidence and students already understand and understand when the teacher teaches with the guided inquiry model.
2. Assessment of learning outcomes in cycle 2 is 77.80%. This shows that the value achieved has met the KKM standard.
3. The increase in learning outcomes is due to teacher teaching activities using guided inquiry learning models by making improvements in accordance with the results of reflection on the implementation of cycle 1.
4. Increased student activity in the very high category. This is because students are motivated to carry out learning activities. Students are also enthusiastic and enthusiastic in carrying out experimental activities, collecting and analyzing data to answer problems. In addition, students have the courage to read the results of their learning in front of the class.

The results of the pre-action test showed that students' science learning outcomes on the theme "Heat and its transfer, Theme 6 sub-theme Heat and its transfer, sub-theme 2 heat transfer around us, heat transfer around us, learning 1 learning 1 heat transfer by conduction is still low. Therefore, it is necessary to take corrective actions that must be taken immediately by researchers to improve student learning outcomes. Pre-action learning uses the lecture method, question and answer and assignments. Learning is carried out teacher-centered. After the subject matter is delivered, the teacher provides an evaluation of the material being studied.

Based on the results of the evaluation given to the pre-action students, they obtained very low learning outcomes, namely the percentage of students who completed 25% with an average learning outcome of 51.50 and the criteria for achieving minimum completeness (KKM) were 70. Looking at the results of the analysis obtained above, it shows that learning at the pre-cycle stage needs to be continued to the next stage, namely cycle 1 in order to increase mastery of science material and improve learning.

In the first cycle of learning, efforts are made

to increase students' motivation and learning outcomes so that a learning model that can be carried out by students by experiencing it themselves is the key to meaningfulness therefore there is a need for efforts that can be taken to increase student motivation and learning outcomes. One of the learning models is the Guided Inquiry model so that students are free to develop the concepts they learn, not just the material that is recorded and then memorized (Lusidawaty et al., 2020).

Learning in cycle 1 is carried out using a guided inquiry learning model, namely on theme 6 heat and its transfer, sub theme 2 heat transfer around us learning 2 heat transfer by convection. At the beginning of the lesson the teacher conveys the learning objectives, motivates students, and divides students into several groups. At the end of the lesson the teacher gives an evaluation to find out student learning outcomes and distributes questionnaires to determine student motivation in carrying out learning.

Based on the results of the questionnaire distributed to students, the results of student motivation in cycle 1 were 78.25% in the high category. In addition to the assessment of student learning motivation, an assessment of student learning outcomes was also carried out which was analyzed using descriptive data which showed the acquisition of an average score of 61.45 and had not achieved the classical completeness to be achieved, namely 70.

Observations made by two observers were observations of teacher activities and student activities. Teacher activity from observer observation with a value of 75.89 with an active category. In addition to the teacher's activities, observers also observed student activities in learning by showing the results of 74.40 in the active category.

Improvements in learning are carried out in cycle 2 by correcting deficiencies in cycle 1. Learning in cycle 2 using the Guided Inquiry learning model emphasizes more on the activities carried out by students, this is explained by Nurmayani et al., (2018) that student activities Using all the senses in teaching and learning activities will increase memory strengthening and change attitudes so that the learning outcomes obtained are more durable.

In cycle 2, learning is carried out on theme 8, namely the environment of our friends, sub-theme 2 changes in the learning environment 1 material for the groundwater cycle. Learning is carried out using the Guided Inquiry learning model by paying attention to reflections on the implementation in cycle 1. Students sit in groups according to their respective groups then students carry out learning activities by conducting experiments according to the subject matter with teacher guidance based on the syntax contained in the Learning Implementation Plan (RPP).

Based on the research data, the students' learning motivation showed 85.70 with a very high category. Motivation makes someone try to improve the work results that wants to achieve in Fitri et al., (2018). If students have very high motivation, these students will have a high desire to excel, so that they will encourage themselves to achieve success and avoid failure. In addition, according to Maupa S., et al., (2021) that guided inquiry learning is effective in increasing students' learning motivation and students' science process skills.

Motivation has an effect on student learning outcomes with higher-order thinking skills. Students with very high motivation will look enthusiastic in participating in the lessons given by the teacher, this can be seen in the assessment of student learning outcomes in cycle 2 which has increased with the classical score of 77.80, this shows that the classical score has reached the Minimum Completeness Criteria (KKM) is 70.

Science learning is not only memorized, but students are directly involved in experimental activities so that they are able to bring up an attitude of curiosity to understand a problem. The activity of searching and finding their own answers critically, systematically, logically and analytically can confidently be carried out by students through experimental activities using the syntax of guided inquiry learning (Aras et al., 2021).

This increase in learning outcomes is due to the fact that students already understand the implementation of the guided inquiry learning model based on the stages in the learning process. Guided inquiry learning model according to Khotimah & Partono, (2015) states that Guided Inquiry model learning on student learning outcomes, this is due to several factors, namely: 1. Implementation of learning; 2. The problems presented can arouse the interest and curiosity of students; 3. Practical tools that support learning; 4. There is an opportunity for students to communicate the results of the discussion.

Guided inquiry learning limits the teacher's role as a source of information (Nurmayani et al., 2018). The teacher does not tell the concepts but guides students to find these concepts through learning activities, so that the concepts obtained based on these activities and learning experiences will always be remembered by students for a long time.

Guided inquiry learning also emphasizes maximum student activities directed at seeking and finding their own answers to something in question. This is in accordance with the opinion Nurmayani et al., (2018) which states that increasing student learning activities will improve student learning outcomes. Direct experience gained during the learning process using the Guided Inquiry model will improve student learning outcomes.

Observers carried out by two observers were observations of teacher activities and student activities in cycle 2 experienced an increase in teacher activity from observer observations with a

value of 89.28% with a very high category In addition to teacher activities, observers also observed student activities in learning by showing the results 87.70 % with very active category.

Conclusion

Based on the results of the research and discussion described in the previous chapter, the following conclusions can be drawn:

1. The application of the Guided Inquiry learning model can increase students' learning motivation in science learning. This is based on the results of the student learning motivation questionnaire in cycle 1, the results of the student learning motivation questionnaire, namely 78.25 with the high category increasing in cycle 2 to 85.70% with very high category.
2. The application of the guided inquiry learning model can improve student learning outcomes in science learning, this is based on student learning outcomes in cycle 1 obtaining an average learning outcome of 61.45% of students obtaining scores that meet the minimum completeness criteria (KKM), namely 70 but has not yet reached classical completeness. In cycle 2, student learning outcomes increased to 77.80%. This increase has met the expected classical completeness, which is 70.

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