Improve Science Process Skills and Learning Outcomes with The Quantum Learning Model

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Abstract

Learning in elementary schools that has not been optimal in involving students actively will have a negative impact on science process skills and learning outcomes. Students will be actively involved in learning if the applied learning model involves students to experience the learning process as a whole. This research is a Classroom Action Research (CAR) which is carried out in two cycles.. Retrieval of data using the observation sheet and learning outcome test questions. The results obtained indicate that the learning process with Quantum Learning can improve the science process skills of students. Increasing science process skills on average obtains very good criteria. The improved science process skills include; 1) Formulating Problems, 2) Formulating hypotheses, 3) Observing, 4) Collecting data, 5) concluding, 6) Communicating. Furthermore, the learning outcomes obtained by students using the Quantum Learning model can increase learning outcomes from cycle I by 73.68%, increasing to 89.47% in Cycle II. So the Quantum Learning learning model can improve the process skills and learning outcomes of students in grade V Elementary School.

Keywords: Process skills; learning outcomes; quantum learning.

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INTRODUCTION

This is where the teacher has a very important role in cultivating and developing the potential that exists in each student. So that the teacher must be able to present an interactive and communicative learning process and become a facilitator or motivator in the learning process. Science process skills are an important part of the learning process. The existence of science process skills will train the psychomotor of students through the experiences gained in the learning process.

The learning process in elementary schools that applies the 2013 curriculum is designed using integrated thematic learning. Integrated thematic learning is a learning model that emphasizes organizing material that is integrated and integrated into a theme (Kurniawan, 2011). The application of integrated learning requires students to use all their abilities to develop aspects of knowledge, attitudes and skills. So the readiness of the teacher in the learning process greatly influences the activities of students in learning in the classroom.

The results of observations obtained from grade V SDN 219/II BTN Lintas Asri indicated that the integrated thematic learning outcomes of students were not in line with expectations. Students have not been actively involved in the learning process. The activities that there are a lot of listening, taking notes and doing assignments, while the teacher only focuses on the students' book. In this situation, it will be difficult to develop knowledge, skills and attitudes. As a result, the learning process will be monotonous and boring so that what the teacher says is difficult for students to accept. When learning is difficult to accept, the learning objectives will not be achieved, one of which is the aspect of science process skills.

Students must be trained to apply science process skills so that learning becomes meaning with real experienc when solving scientific phenomena, concepts and events. Science process skills are intellectual skills that must be possessed and used to understand a incident (Dahar, 1996). Science process skills will be seen in learning activities both in class and in experimental activities. In order for these process skills to develop, the teacher should have the readiness to arrange learning instruments in accordance with the characteristics of the material to be taught and completed with evaluation. According to Ashadi (2015) that science process skills can be improved through quantum learning models in elementary school students. Furthermore Isnaini (2016) in his research shows that quantum learning affects learning process skills. The results of the above research show how important science process skills are taught to students from an early age. Science process skills will be increasingly visible through experimental activities in thematic learning. In order for these process skills to develop, it is necessary to prepare learning instruments that are in accordance with the characteristics of the material to be taught and complete with evaluation.

Indicators of science process skills include observing (calculating, measuring, classifying), formulating problems, making hypotheses, identifying variables and defining operationally these variables, planning research with appropriate procedures, analyzing, interpreting, inference, and communicating results (Verawati, NNSP 2016). By developing science process skills, students will experience an interesting and meaning learning process. Students will find facts, events and phenomena that are experienced in real time during the learning process. Therefore, it is important to develop science process skills so that students are active in the learning process and can develop their attitudes and knowledge.

Measurement of learning outcomes that occurs generally puts forward the aspects of knowledge, while the aspect of skills and attitudes are ignored. This contradict the assessment system, in the 2013 curriculum which requires students to acquired competency knowledge, skills and attitude. These three aspects of competence will be closely related to the learning outcomes of students. Science process skills make a very high contribution to the cognitive abilities of students (Sari, I N., Azwar, I., Riska., 2017). The learning outcomes test for class V SDN 219/II BTN Lintas Asri obtained a lot of student scores below the KKM of 70. Only 8 students passed the KKM or 42.11%, while 11 students or 57.89% did not complete. This indicates that cognitive abilities in thematic learning that have been running have not properly instilled science process skills. See the existing conditions, it is necessary to improve the learning process that is applied in the classroom.

The learning process can be improved by apply a model that is deemed appropriate to the

characteristics of the material to be taught. Learning models that emphasize students playing an active role are needed to improve process skills and cognitive learning outcomes. One model that can be applied is Quantum Learning. The implementation of learning with the Quantum Learning model is based on five principles, namely (1) everything speaks; (2) everything has a purpose; (3) experience before giving names; (4) acknowledge every effort; and (5) if it is worth studying, it is also worth celebrating (Deporter in Shoimin, 2014: 141). This principle is described in a learning framework whose application is better known as implant, experience, name, demonstrate, repeat, and celebrate (Deporter in Kosasih, 2013: 30).

The advantages of the Quantum Learning model include: (1) Integrating positive suggestions and interactions with the environment that can affect the learning process and outcomes of students. (2) A pleasant learning environment can lead to motivation in students. (3) Can increase academic potential and creative potential contained in students (Huda, 2014: 194). The advantaged of this Quantum Learning model will be very helpful in the learning process to improve science process skills and cognitive learning outcomes of students.

Based on the description of the above problems, it is important to conduct research with the aim of improving science process skills and learning outcomes of Class V students of SDN 219/II BTN Lintas Asri.

METHOD

This research is a classroom action research. The research was conducted in class V SD Negeri 219 / II BTN Lintas Asri in the even semester of the 2019/2020 school year. There were 19 students involved in the study consisting of 10 women and 9 men. The stages of the CAR cycle consist of planning, acting, observing, and reflecting.

The indicator of success in research is an increase in cognitive learning outcomes in thematic learning, achieving at least 75% classical completeness. If students can achieve 75% classical completeness, the research can be said to be successful or complete. Then the success of the process skills is 75% with a minimum of good criteria. Indicators of process skills used in this study include 1) Formulating Problems, 2) Formulating hypotheses, 3) Observing, 4) Collecting data, 5) concluding, 6) Communicating.

The data collection instruments consisted of learning outcome test questions and science process skills observation sheets. The data obtained will be analyzed descriptively quantitatively. The calculation of data on science process skills and students' cognitive outcomes was calculated using a formula:

$$N_k = \frac{R}{N} \, x \, 100 \, \%$$

Information :

N_k	: The value
R	: Score obtained
N	: Maximum Score
100%	: Fixed number

Table 1. Science Process Skills Value Categories

No	Interval	Category
1	≥ 80	Very good
2	70 – 79	Good
3	60 – 69	Enough
4	≤ 59	Less

(Source; Aqib, dkk., 2009: 41)

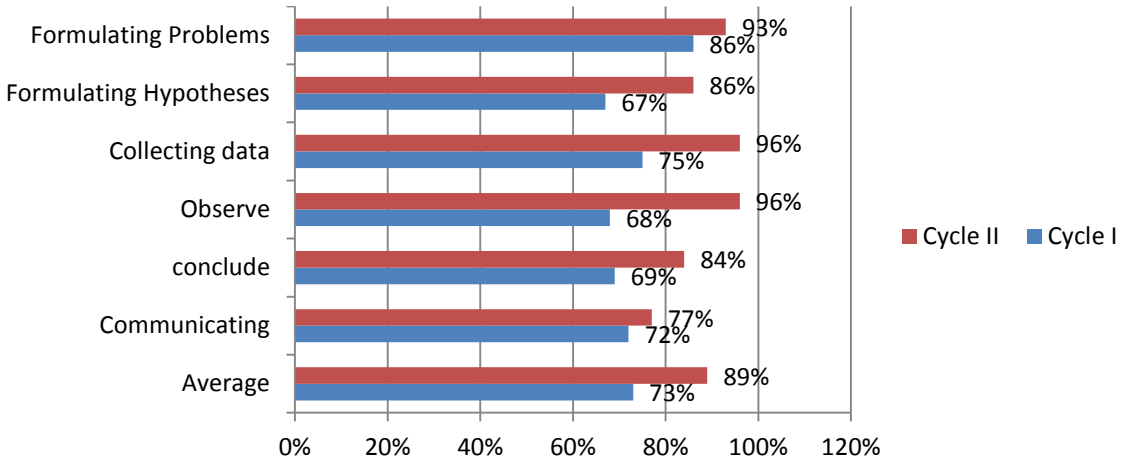
RESULTS AND DISCUSSION

The learning process in cycles I and II was carried out in class V with the theme of 6 Heat and Its Transfer Materials. Implementation of cycle I on January 13-15, 2020. Then for the implementation of cycle II on January 18-21 2020. The stage in the implementation of this class action assessment include; The planning stage, this activity is carried out by compiling a lesson plan using the Quantum Learning model, preparing student worksheets, observation sheets and evaluation instruments. Furthermore, the implementation stage, the teacher begins the learning process by conveying the learning objectives and activities that will be carried out, then the teacher introduces the Theme 6 Heat and Its Transfer with Sub-theme 2 Heat transfer around us. After that, carry out core activities in learning by applying the stages of the Quantum Learning model, including the following.

a) Teachers foster students interest in learning by dividing groups heterogeneously.
b) The teacher guides students to gain learning experience in groups by dividing student worksheets as a guide in conducting experiments on conduction heat transfer.

c) The teacher guides students to make analyzes and draw conclusions based on experiments that have been carried out.
d) The teacher guides students to gain learning experience in groups by dividing student worksheets as a guide in conducting experiments on conduction heat transfer..
e) Students repeat the lessons that have been studied before and the teacher corrects the results of the discussion that are not quite right.
f) The teacher gives awards in the form of applause together and a sign of appreciation to students who dare to conclude learning material in front of the class.

The results of observations of students' science process skills in conducting experiments in cycles I and II are presented in the Graph 1



Graph 1. Science Process Skills in Cycles I and II

Based on Figure 1, the science process skills carried out in each cycle by students on average have increased. This shows that each learning step with the Quantum Learning model trains students' science process skills well. Science process skills of students in the aspect of formulating problems in cycle I obtained a percentage of 86% and in cycle II obtained a percentage of 93%. This shows that the aspect of formulating the problem is in the very good category. the ability to formulate problems is an ability that must be trained maximally, because this becomes the basis for the next stage. The formulation of the problem is a guiding question that will be used as a basis or basis for getting answers to a problem that has been previously raised in an experiment (LKMM, 2012).

Students are trained to formulate problems through growing interest in learning. Cultivating interest in learning is part of the first stage of Quantum Learning. The teacher fosters students' interest in learning through images related to conduction heat transfer and convection heat transfer. then the teacher asks questions according to the picture. The question given by this teacher is an effort to explore the knowledge of students to be able to formulate hypotheses. The results of the class action given show the ability to formulate hypotheses, in this aspect it is 67% in cycle I and 86% in cycle II. This shows that there is an increase in the ability to formulate hypotheses with very good categories. Formulating a hypothesized funding problem is important to be trained in order to encourage students to improve their scientific thinking skills and support the achievement of competence in learning (Liandri, et al. 2017).

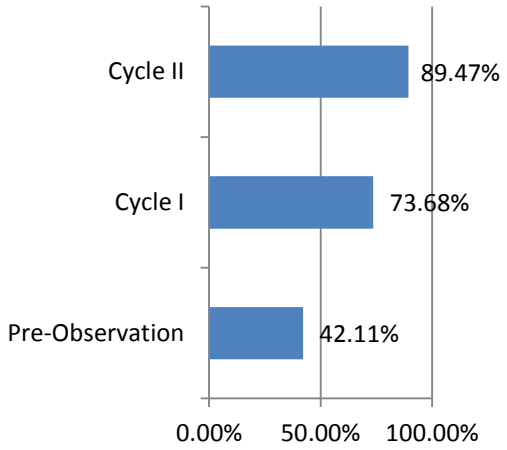
The next process skill is collecting data. The aspect of the ability to collect data in the first cycle was 75% and in the second cycle it was 96% with the very good category. This increase is because the teacher trains students to be able to experience directly in conducting experiments. Students learners gain learning experience by conducting experiments on conduction heat transfer, namely by heating two

spoons with a cloth and without a cloth which is heated on a burning candle and in cycle II convection heat transfer, namely observing what colored ice cubes are inserted into in a glass of hot water. After students experience the experiment directly, students observe the experimental process and analyze it. The ability in cycle I was 68% and in cycle II was 96% with very good category.

The next process skill is concluding. This aspect can be trained for students through the Quantum Teaching step, namely name. In this step students draw conclusions based on experiments that have been carried out by filling out student worksheets based on experiments. The result of the ability to conclude in the first cycle was 69% and in the second cycle it was 84% with the very good category. This is in line with Kurnianto's research (2010) that with a simple practicum with the help of student worksheets, students can develop concluding skills with an average of 84.44%.

The last step of Quantum Teaching is demonstration, students are given the opportunity to communicate / present the results of the experiments from each group, the other groups pay attention and provide responses from the group's observations that present their observations in front of the class. Communication process skills in this aspect were 72% in cycle I and 77% in cycle II with good categories. This is in line with Adhitama's (2015) research that Quantum Learning has an effect of 92.8% on the level of communication skills of students in the experimental class. However, in its realization there were still some problems, including students who did not focus on presenting their practicum results, there were still jokes and little time allocation for presenting, so there were still passive students. Therefore, the role of the teacher to continue guiding students to be able to communicate the findings must be done as well as possible. This aims to develop honesty, conscientiousness, tolerance, and train systematic thinking skills, as well as train students to be able to express opinions clearly, and develop good and correct language skills (Director General of Teachers and Education Personnel, 2018).

Furthermore, the cognitive learning outcomes of students after participating in the learning process with the Quantum Learning model from cycle I and cycle II are presented in Graph 2.



Graph 2. Pre Cognitive Learning Outcomes, Cycle I and Cycle II

Based on Figure 1, it shows that the learning outcomes obtained by students in cycle I were 73.68% or 14 people who passed the KKM and those who did not pass the KKM were 26.32% or 5 people. The learning result shows that in cycle I it has not been successful as the indicator that has been set is 75%. The obstacles in cycle I include 1) The teacher should be firm in directing students when conducting experiments and providing opportunities for students to conclude learning material in front of the class. 2) Students do not participate in learning because they do not understand the material and lack confidence when explaining the material in front of the class. 3) Students are less disciplined in conducting experiments, students are also less cooperative in groups. 4) The teacher must be able to divert the attention of students so that students pay attention to the lesson well and provide motivation so that students are confident in concluding learning material.

Furthermore, for the second cycle, based on Graph 1, the learning outcomes of students who completed were 89.47%. The achievements in cycle II exceed the predetermined success indicators, namely 75%. This shows that the learning outcomes of students in cycle II are declared successful. The learning process and outcomes in cycle II run better than in cycle I. This is in line with Yahya's (2017) research that the application of the Quantum model in learning has a significant effect on learning outcomes. This increase was due to improvements based on reflection in cycle I. For example, by improving the learning process by the teacher by applying discipline. Discipline attitude can be cultivated by teacher strategies in

effective classroom management (Yantoro, 2020).

In addition, by fostering students' interest in learning through videos about the fish auction process and fostering student interest in learning through images related to radiation heat transfer. Students observe videos and pictures, then the teacher asks inducement questions according to the video and pictures, for example, what source of heat energy is used why this happens students answer inducement questions from the teacher enthusiastically as a step to foster the enthusiasm of students in the teaching and learning process. The use of media in learning with Quantum Learning has an influence on students' science learning outcomes (Pratiwi, 2017).

So the Quantum Learning Model can improve science process skills and learning outcomes.

CONCLUSION

Process skills and learning outcomes are important aspects to always be considered in the learning process. The learning process with Quantum Learning can improve the science process skills of students. Increasing science process skills on average obtains very good criteria. The improved science process skills include; 1) Formulating Problems, 2) Formulating hypotheses, 3) Observing, 4) Collecting data, 5) concluding, 6) Communicating. Furthermore, the learning outcomes obtained by students using the Quantum Learning model can increase learning outcomes from cycle I by 73.68%, increasing to 89.47% in Cycle II. So the Quantum Learning learning model can improve the process skills and learning outcomes of students in grade V Elementary School.

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