

The Effect of Collaborative Based Inquiry Training Learning Model and Scientific Attitudes toward the Science Process Skills of Natural Resource at 1 Methodist Elementary School Medan

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Abstract: *This study aims to analyze: (1) the effect of learning model to students' science process skill; (2) the effect of the scientific attitude level on the students' science process skills and (3) the interaction between the learning model and the level of scientific attitude in influencing students' science process skills. This research is a quasi experiment with 2 x 2 factorial designs. The population of this research is the fourth grade students of SD Methodist 1 Medan, and the sample is chosen by purposive random sampling consisted of two classes. The experimental class is treated by the model of inquiry training based on collaborative and control class is treated by direct instruction. The instruments used consist of: science process skill test and scientific attitude questionnaire. Data analysis is performed using two-way ANAVA. The results of this study indicate that: (1) The students' science process skill that taught by collaborative based Inquiry Training model is better than Direct Instruction model; (2) High scientific attitudes is better than low scientific attitudes in influencing students' science process skills and (3) there is an interaction between Collaborative-based Inquiry Training model and Direct Instruction model with students' scientific attitude in influencing students' science process skill result. The results suggest that collaborative-based inquiry training model is a solution and alternative choice of teachers in improving the skills of the science process.*

Keywords - Science Process Skills, Scientific Attitudes, Inquiry Training, Natural Resources, Collaborative

Date of Submission: 23-10-2017

Date of acceptance: 30-11-2017

I. Introduction

Education is one effort to educate the life of the nation and it is a key to achieve the goals of a nation. It is believed that it is able to encourage the students' potential as a reliable resource candidate in order to be critical, logical, and innovative in dealing with and solving any problems encountered. Education requires continuous improvement. Education is not only emphasized on the mastery of the material, but also on the mastery of skills. Education that can support future development is education that is able to develop the potential of conscience and potential competence of learners. Therefore, current education and learning programs should be more directed or more oriented to individual learners. Amri (2010) says "Education does not expect to appear human beings who become alienated from the environment of society, but it is expected to build community life. Therefore, the purpose, content, and process of education should be adapted to the needs, conditions, and characteristics of wealth and development in society.

One effort to improve the quality of education is to change the paradigm of education, especially in elementary school (SD) from teacher centered learning towards student centered learning. It requires each teacher to be more creative in developing learning. It enables students to excel through real fun activities and to develop their potential optimally. In the learning process, every teacher always expects his students to understand the concepts of material and achieve the best learning outcomes.

The role of teachers is very complex, evolving in accordance with the development of history and times, and the expectations of society. The changing of paradigm and values in the 21st century, the standard of the teacher is more emphasis on professional ability. An effective teacher is a qualified person and can build good relationships with students, understand basic knowledge of learning and teaching, be able to carry out learning activities well, have the attitude and skills to reflect and solve problems, and ensure that learning is a process throughout life. In addition, effective teachers can develop strategies, methods, and skills to achieve success in improving the quality of educating students. Maoko (2012)

states that the factors that determine the quality of learning are, (1) the quality of the tasks assigned to the students or the Lesson Plans, (2) learning in the established relationships (dialogue and collaboration), and (3) spirit, cognition and emotion of students.

The teaching and learning process contains interaction activities between teachers, students and reciprocal communication that takes place in an educative situation. So learning is not just a transfer of knowledge from the teacher to the students but also the students are given problems that require search, experiment, analysis, synthesis, comparison, thought, and conclusions by students, in order to find their own answer to a concept or theory. In accordance with the discussion, it can be seen that the main purpose of learning activities in the school should be "teach students how to learn". The ultimate goal of organizing this learning activity has a meaning to lay the foundation for lifelong learning. This goal must be achieved if we want to meet the demands of accelerated changes that last continuously. Today, it is no longer the time for teachers to be the first to act as communicators of facts, concepts, and principles". The existence of various research findings, mentioning "facts, concepts, and principles" is often shorter. Therefore, the main purpose of organizing learning activities in schools is to operate students in order to be able to process and gain knowledge, skills, and attitudes for himself. Based on this, the main points that should be the experience of the students are important ways to process and acquire the knowledge, skills, and attitudes that become their needs.

Science education is one aspect of education that used as a tool to achieve educational goals. According to the Ministry of National Education (2003) states that science education is not only composed of facts, concepts, theories that can be memorized, but also consists of activities or processes actively using the mind and scientific attitude in learning natural phenomena that have not been explained. Thus, the continuous demand updates science becomes a necessity. The role of science education emphasizes the provision of direct experience to develop competence so that students are able to explore and understand the natural surroundings scientifically. It is geared toward "finding out" and "doing" so it can help students to know more deeply Cain and Evans (in Rustaman, 2005) state that science contains four things: content or products, processes or methods, attitudes and technologies. If science contains the four things mentioned above, then when learning science students need to experience them.

In learning science, students should not only learn the product, but also aspects of the process, attitude and technology so that students can understand science as a whole. It is previously stated that teaching is the transfer of knowledge from teachers to students. Therefore it is not surprising why many teachers teach by way of lectures, because for them science is a collection of knowledge that must be transferred to students. In teaching science in elementary school, it will be a very interesting thing, considering that the age of primary school is an important period for children in forming basic knowledge through experience both at school and in the environment where they live. It means that it is very important to instill the scientific foundations in order to obtain a strong foundation in mastering the subject matter. If it is presented with improper learning model then it will be an obstacle for students in developing their knowledge.

Facts gained in the field are not in line with expectations, where the science lesson is not applied yet by using appropriate learning models in learning it, some of which are only taught by traditional (teacher-centered methods) and are dominated by notes and work-out exercises or often called Direct Instruction (DI). Students need teachers who no longer use direct instruction model. Where Science teachers who primarily teach at the elementary level, it is time to design an approach that can create an atmosphere of learning that is able to improve students' activeness in the classroom. This is in line with the statement of Azizah&Parmin (2012) that students are given a more active opportunity in digging and constructing their knowledge through the surrounding environment.

It is needed a lesson that no longer uses direct instruction model. Science teachers especially for elementary teachers should be demanded in designing a model of learning that can create an atmosphere of learning. It can enhance students' activity in the classroom. It is in line with the statement of Azizah&Parmin (2012) that learners are given a more active opportunity in digging and constructing their knowledge through the surrounding environment. Based on the results of the observation of early researchers also about 80% of grade IV students have difficulty in learning science. It can be seen that the completeness achieved by students in the first semester has not reached the standard of learning completeness score specified by the school that is 65, while the score achieved by the students ranged from 50 to 60. The low understanding of students on the subject matter is caused by learning activities, students only act passively to receive information without experiencing it, students are less actively asked. When the teacher explains the material, asks the student who wants to ask questions related to the material given by the teacher, the student is less responsive, the students tend to pay attention only to the teacher explain, but are reluctant to ask. It indicates that students' research ability is still relatively low. Students have not actively inquired about the material submitted by the teacher. Asking is one component of the skill in researching. In addition, students also consider science subjects are difficult to understand because many things cannot be seen directly. Learning is also still expository. Other words, teachers explain the material to students without any process in understanding a concept. In addition, students also appear to learn more individually. The students who have achievements do not want to help friends and students who understand less shy to ask. Collaborative learning has benefits because students become more familiar with simple language and without any limitations. Collaborative teaching is working together in small groups to ensure that all students master the material, Johnson (2010).

Moreover, it is found that teachers do not pay special attention yet science process skill and it rarely practice at laboratory so the result is not maximal. Science process skill is defined as the horizon or principle to develop intellectual skill, social, and physic that sources from the base skill of students. In accordance with that, Kurniati (2001) explains that the approach of process skill emphasizes on the growth and development of certain skills in students in order to enable to process information to get fact, concept, or the development of concept and value

One of solutions that can be performed by teacher to overcome the problems is to design learning activity based on inquiry. By applying inquiry training, it can increase students' research ability and alter students' way in learning to be more active, (Gormally, dkk : 2009), besides that, inquiry training also can increase students' cognitive ability, (Vaishnav:2013).

The mastering in teaching science will succeed if students arrange the concept that they need. The implementation of inquiry training is more active to improve science process skill and students learning outcomes, in comparison with direct instruction. It caused by inquiry training involves students actively to find knowledge, as (Joyce:2011) explains the goal of inquiry training is to help students to develop intellectual discipline and skill to arise questions and search for the hidden answer from students' curiosity. It is line with S. Vaishnav (2013) that inquiry training significantly improves cognitive and affective outcomes as well as to contribute students' attitude. Moreover, Pandey (2011) concludes that inquiry training is more effective than conventional learning model in improving students learning outcomes.

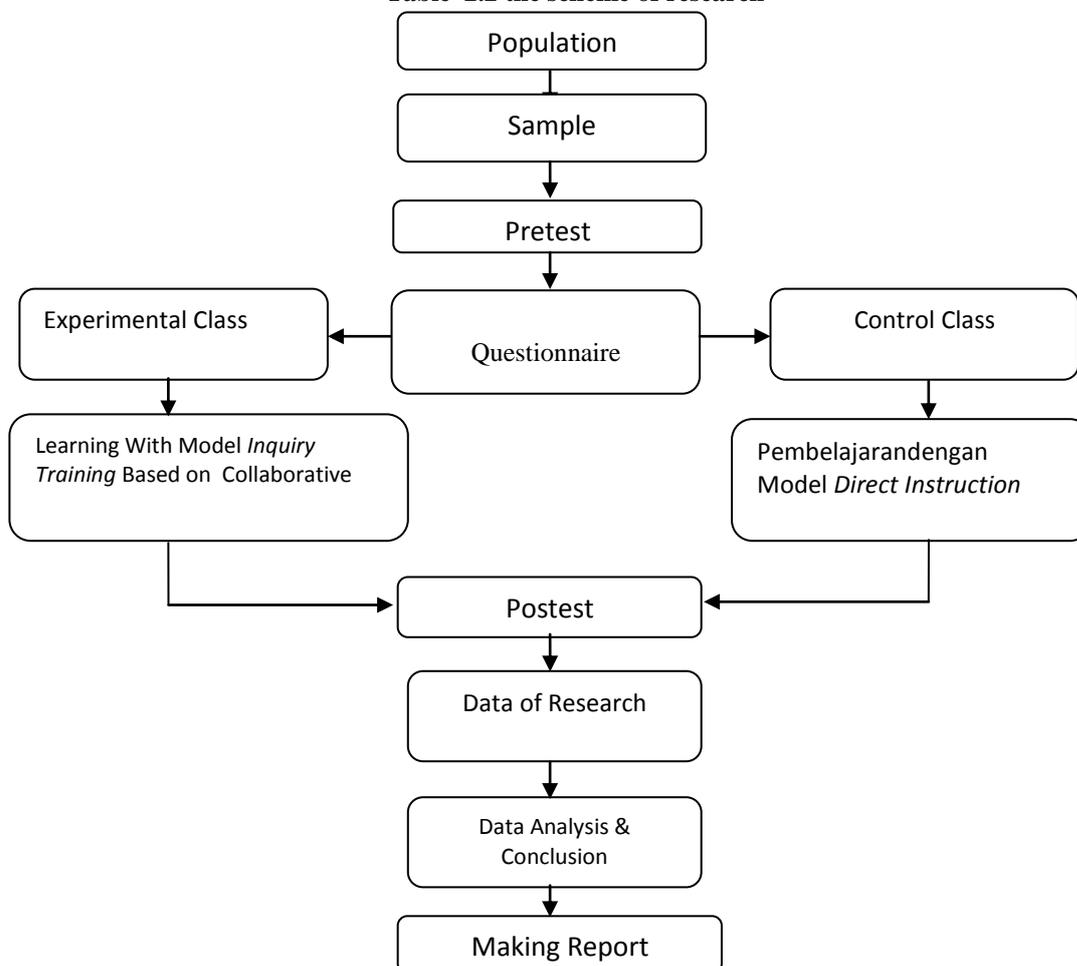
II. Research Methodology

This research is conducted at Methodist Elementary School, academic year 2106/2017. It is performed in April until June 2017. The population in this research is students of Methodist Elementary School Medan .the amount of population are 60 students that consisted of two classes, IV- A and IV- B. sampling is performed by purposive sampling class. Class IV-A is as experimental class that taught by inquiry training based on collaborative, consisted of 30 students. Meanwhile, class IV-B is as control class that taught by direct instruction , consisted of 30 students. Variable in this research is consisted of three kinds, namely free, moderate, and bounded variable. It is designed by quasi experiment. It is applied factorial 2 x 2, as it is provided in Table 2.1

Table 2.1 Design ANOVA two ways with Factorial 2 x 2

Learning Model	<i>Inquiry Training Based on Direct Instruction</i>	
	Colaboratif (Eksperimental class) (A ₁)	(Control Class) (A ₂)
Scientific Attitude		
Tinggi (B ₁)	A ₁ B ₁	A ₂ B ₁
Rendah (B ₂)	A ₁ B ₂	A ₂ B ₂

Table 2.2 the scheme of research



III. Result and Discussion

Student's Science Process Skill Using Inquiry Training Model based on collaborative is better than Direct Instruction Model. Based on the data processing obtained, there is a difference of students' science process skill which is taught by Inquiry Training model with direct instruction model where the average score of the students' science process skill which is taught by the collaborative learning model of Inquiry Training is higher, that is 80.76 with the average gain score of 0.69. Meanwhile, the average score of the group of students who are taught by direct instruction model is 63.93 with the average gain score of 0,58. This fact proves that the use of Collaborative based Inquiry Training model is better in improving students' science process skill than using direct instruction model.

Thus, teaching science with Inquiry Training based on collaborative is better than using direct instruction model. Inquiry Training model is a learning concept that helps teachers connect between materials taught to real situations experienced by students and encourages students to make connections between their knowledge and application in everyday life. Learning in the concept of Inquiry Training is (a) learning is not memorizing, but the process of constructing knowledge according to their experience. Therefore, the more experience the more knowledge they will gain; (b) learning is not merely a gathering of facts. This knowledge is basically the organization of all experienced, so that with the knowledge possessed will affect the patterns of human behavior, such as thinking, acting, solving problems, and also the appearance of a person. The wider the knowledge of people, the more effective they think. (c) learning is the problem-solving process, because by solving the problem the child will develop completely that not only develops intellectually, but also mentally and emotionally. Learning how children deal with problems, (d) Learning is a process of self-experience that develops from the simple to the complex. Therefore learning cannot be at once, but in accordance with the rhythm of students' ability, (e) learning essentially captures the knowledge from reality. Therefore, the knowledge gained is the knowledge that has meaning for the life of the child (real world learning). One characteristic of the Inquiry Training model is the constructivism.

According to the paradigm of constructivism, students are given the opportunity to construct their knowledge. They build their own frame of mind so that the knowledge obtained can be stored for long periods of time. In accordance with Piaget's view that cognitive development largely depends on how far the child manipulates and active in interacting with the environment. In addition Vygotsky also states that (1) knowledge is contrasted from experience, (2) the science process skill is derived from individual interpretation of knowledge, (3) learning is "active process" which in meaning is developed based on experience. Inquiry training model relates to real-world students. When students face problems, students can recall their knowledge to be used in solving the problems they are facing In addition, the learning community in the characteristics of Inquiry Training model allows students to acquire and share knowledge in learning groups.

In the concept of learning society is expected to occur cooperation between students in solving problems and share knowledge with friends who do not know. Inquiry Training model is not only learned in small groups but also to form values such as caring and eliminate egoism among students. So that knowledge acquisition among students is expected will be more equitable, creating an atmosphere of intimacy between students and communication effectiveness. Maasaki (2012) states that in the group discussion activities is expected each student express their idea without reluctance, mutual discussion and mutual learning. From this research, it is found that the average of the result students' science process skill which is taught by Inquiry Training model is higher than taught by Direct Instruction model. The research findings also support previous research conducted by Afcariono (2008) which states that Inquiry Training can improve students' ability to think actively. Each problem in science subject can be formulated by the students and how they give argumentation toward solving problem. Therefore, problem based learning can improve higher students' skill to think.

Similarly, it was found by Nurhayati (2010) that the Inquiry Training Strategy provides better students' science process skills compared to the expository learning strategy in Simple Aircraft material. Gita (2014) says the implementation of Inquiry Training learning through cooperative learning improves learning achievement of science class V SD 3 Sambangan. The results of Anita (2015) also shows that there is a difference of students' science process skill which is taught by Collaborative-based Inquiry Training model with eXeLearning media with students who are taught by direct instruction without media. Raharja (2011) states that Inquiry Training can improve students' problem solving skills.

Students' Science Process Skills with Higher Scientific Attitude are Better Than Students with Low Scientific Attitudes. The above conclusion is in line with Munandar's opinion in Trianto (2011) gives the reason that the child's scientific attitude needs to be developed because by creating the child can manifest themselves as the ability to see the variety of possible solutions to a problem, to give satisfaction to the individual and to enable improving the quality of his life. Furthermore Killely (2005) states that the Inquiry Training model has advantages in helping students to sort, define and refine the problem, help develop critical thinking, verbal and writing communication and develop group work. Similarly, Awang's (2008) explains that Inquiry Training can

improve students' creative ability; even though students feel problem-based learning is difficult. But they say they do more thinking than memorize, understand better lessons through discussion.

Based on the above explanation, scientific attitude is a very important part in a learning. This is supported by findings in this study which proves that students who have high scientific attitudes of their scientific process skill results will be better than students who have low scientific attitude. Safitri (2012) also concludes that through the application of Inquiry Training can improve scientific attitude and science process science skills of grade V students in SD Negeri 22 UlakKarang Utara Padang. This study also explains that teachers can apply Inquiry Training to improve scientific attitude and science process science skills of students. Thus, based on the findings, it shows that the application of Inquiry Training model gives a positive influence in improving students' scientific attitude in learning in compared with direct instruction model

Interaction between Collaborative based Inquiry training Learning Model and Direct Instruction Model with Scientific Attitudes influences Skills of Science Processes. The above conclusion, in line with some opinions such as Cooper (2008) states that Inquiry Training is able to develop fundamental cognitive students so that they can understand chemical concepts. Chin and Chia (2005) state that Inquiry Training can cause students cognitive process to be better. It proves that the learning model greatly affects the skills of students' science processes with different learning models, students who were taught by Inquiry Training gets better results than Direct Instruction model

VI. Conclusion, Implication and Suggestion

4.1 Conclusion

Based on the results of research that have been stated before, it can be drawn conclusion as follows:

1. Students' scientific process skills who are taught by Collaborative-based Inquiry Training model is better than Direct Instruction model at Methodist Primary School, Medan, it is obtained that the average of science process skill is 80.76. It is higher than Direct Instruction model of 63.93.
2. High scientific attitude affects the students' science process skills better than low scientific attitude, that average score of science process skill of students who have high scientific attitude equals to 83,64. It is higher than low scientific attitude that equals to 61.06.
3. There is an interaction between the Collaborative Inquiry Training-based learning model and the Direct Instruction model with the students' scientific attitude in influencing the students' science process skill results. It is due to the students' science-process skills that are taught by Collaborative-based Inquiry-based learning models with high scientific attitude are better than Direct Instruction models with low scientific attitude. Students' science-process skills learned with collaborative learning-based Inquiry-Based Training models with low scientific attitude are better than Direct Instruction model with low scientific attitude, and the students' science-process skills who are taught by Direct Instruction models with high scientific attitude are better than Direct Instruction model with low scientific attitude.

4.2 Implication

Learning is the activity of achieving competence, a teacher who wants his students to gain competence should try to think of appropriate learning model that will be used in the achievement of learning competencies, because different competencies will be different learning models. As the results of this study show that the average the results of science process skill of Elementary School students who are taught with Inquiry Training model is higher than that taught by direct learning model. It suggests that in the science lesson, the Inquiry Training instruction model is more appropriate to apply than the direct learning model.

Science learning with Inquiry Training model is not only product oriented but process oriented. The focus of learning is on the students' ability to ask questions, to propose hypotheses and to conduct an inquiry to answer the questions they ask. Thus, learning is not only oriented to the student's ability to reflect on what the teacher is doing or informing. The emphases of learning lies in the ability of students to express, put, and organize ideas so that they can discover and form their own knowledge. In learning, teachers should be able to design problems that match the problems of students in their daily lives.

The implication of Inquiry training in science requires teachers who can create a conducive and responsive atmosphere that directs students to be ready to implement the lesson; teachers should act as facilitators and learning motivators. The role as a facilitator and learning motivator will provide wide opportunities and encouragement to students to be able to conduct investigation activities so that students can put their ideas to draw conclusions about the concept of science based on the results of the investigation not because of the needs of teachers.

The problem-solving learning model always considers the students' cognitive structural development. Giving experience to students enables students as active students who construct their own knowledge through the interaction and actions of students to adapt new concepts and ideas to the cognitive structure of students, analyze what they learn with what they already know with what they need in experience the new one.

The implications of the different characteristics of students in terms of the level of ability of scientific attitudes suggest to teachers to choose the model of pursuit that is considered at the level of ability of students' scientific attitudes. It is worth doing because the level of ability of students' scientific attitude will contribute to the students will play a role against the students at the learning activities.

Therefore, learning activities should be designed by giving students the opportunity to actively participate in learning to stimulate their cognitive, affective and psychomotor thinking skills. The giving of contextual problems can attract attention and invite students' curiosity to discuss and solve the problems given with steps that are appropriate to the students' level of scientific attitudes so that students will understand the interrelation between science subject matter in school with life daily. Therefore, the applied learning model should be according to the students' thinking ability level.

The results of this study also show that there is interaction of learning model and high scientific attitude toward science process skill. It is indicated by the students with low scientific attitude level and taught by direct learning model, while for students with high scientific attitude level and taught with the instructional model of Inquiry Training is higher than direct learning model. Thus, it can be understood that the instructional model of Inquiry Training is appropriate for students with high scientific attitude level and direct learning model is more effective to teach students with low scientific attitude level.

The results also show that to improve the results of science process skill is influenced by the model of learning applied by the teacher and the level of students' scientific attitude. In this case between teachers and students have the same role and means in improving the results of the process of science. Thus to achieve maximum learning outcomes so the two variables, learning model and the level of scientific attitude of students need to be considered by the teacher.

The results of this study have implications for the Principal of Methodist Elementary School, Medan, along with the teachers of science subjects. By paying attention to the improving of the students' skills through the Inquiry Training model, it is better those who are competent with education perform the training or workshop about the teacher learning model and how to design, and conduct learning activities. The impact of this training results that teachers will have some learning models applied during teaching and learning activities.

4.3. Suggestions

Based on the results and conclusions of this research, researcher has some suggestions as follows:

1. Teachers should use the Inquiry Training model to get benefit from improving students' science process skill results and student creativity through the following steps: (1) encouraging students to explore more deeply about the surrounding natural concepts through experiments, (2) students will be more creative in learning through group learning, (3) each student will get the same opportunity in speaking, (4) dialogue and communication between students make the learning atmosphere more fun.
2. Headmaster should encourage teachers to add literature and to apply it to their students during teaching and learning activities by holding a workshop or training on Inquiry Training model.
3. For further research, it should be able to continue this research by adding other variables, such as self concept, interest, thinking style and student experience of group discussion.

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