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The Development Of Alternative Assessments In Improvement Of Five Science[1]

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ABSTRACT This study begins with problems related to the assessment of science learning that is not optimal. Assessment of learning that has been applied has not been optimal to contribute to the measurement of the five domains of science that reflects the competence as expected.The purpose of this study is to make and use alternative assessments that can improve the five domains of learning science using STS learning model and guided inquiry in MI (Islamic Elementary School) Darul Huda Sleman. This research is the development of alternative assessment system in science learning in MI , involving 42 students OF MI and 40 university students of PGMI major (Education of Islamic Elementary School). Alternative assessment models consisting of a performance test, the assessment sheet of process skills, creativity, and the application has a70% eligibility, so that used in science learning in MI. Nevertheless there are still weaknesses, which are difficult to use on a large class, the observer is needed more than 2. Based on the analysis of research data, there is a significant difference of five domains of science learning outcomes among students in the learning process using the learning model of Science Technology and Society (STS) with students in the learning process using guided inquiry learning model.The study results of students that using STS learning model are higher than those of students in learning using conventional learning models.The difference lies in the domain of creativity, while in the domain of concepts, skills, processes, scientific attitude and the application of science are not in significant difference.

Keywords*: alternative assessment, five domains of science, guided inquiry, STS*

I. INTRODUCTION

Learning science is not only aimed at gaining knowledge of science, as well as mastery of scientific concepts (cognitive), but also to improve the scientific attitude (affective) and science process skills. According to Yager (1992, 1993), the scope of science learning outcomes, there are five domains; consisting of cognitive, science process skills, creativity, scientific, attitude and application.Five domains of science is deemed an extension, development and deepening of three domains Bloom, that is able to improve science learning activities in the classroom and develop a positive attitude towards his subjects (Loucks-Horsley, et al, 1990).Through the five-based science subjects realm of science education, students are expected not only to enhance the knowledge and skills, but also develops a positive attitude towards science itself well with its surroundings, as well as implement and connect it in everyday life more actively (Penelope: 2003).

According Zuhdan K. Prasetyo (2011: 6), there are five domains of science education consisting of: (1) Domain I - Knowledge domain; (2) Domain II - process of science domain; (3) Domain III - creativity domain; (4) Domain IV -attitudinal domain; and (5) Domain V - application and domain connection.Scientific attitude and science process skills are two of the five domains of learning science which is very important. Scientific attitude is the most relevant in the realm of moral development efforts, (a character or akhlakulkarimah) learners. Through this domain, the sense of responsibility, love, and protecting the environment and natural surroundings can be acquired and developed. Science plays an important role in the development of the character of citizens and the state for the progress of science products very rapidly, the efficacy of the process of science that can be transferred in various other fields, and the viscosity of the charge values, attitudes, and moral within science (Salkind: 2013).

Five targets of learning in science education requireconsequences to the measuring tool used.The use of objective and subjective test alone is not very precise. Both forms of the test are only able to describe how much information is collected and the students have a tendency to make students more passive than the creative, because students only taught to remember the materials.

Improving the ability of the five domains of science above may not be mastered by students if the learning process using only conventional learning models, but necessary alternative learning models that

[1]The research was initiated by LEMLIT UIN Sunan Kalijaga Yogyakarta.

provide the opportunity to experiment and experience as inquiry learning model and STS learning model. Therefore it is necessary to do research and developing of alternative assessments to improve the five domains of science using STS learning model and guided inquiry.

II. METHOD OF RESEARCH

This research is a research and development (research and development) that is oriented research to develop and validate educational products. In research and development, the outlines of the development steps are include the following four steps: the need of assessment (of needs analysis), the design of development,the media development (production/development), and the validationof products (test).

In this study, the steps being taken only the validation or test products because at the stage of 1-3 have been carried out with products in the form of alternative assessment models in science learning, which consists of the performance assessment and assessment observation sheets of creativity, science process skills and science applications.

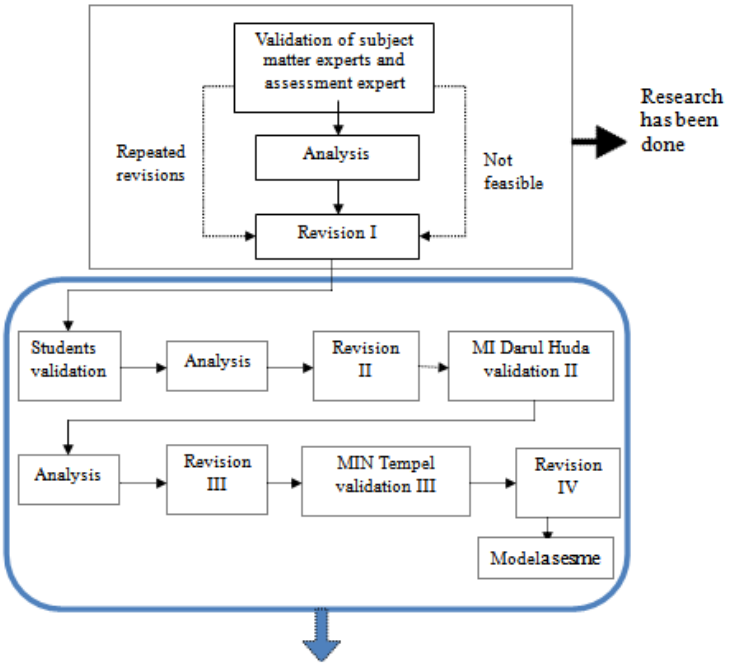

Figure 01.The research

This research is the development of alternative assessment system in science learning in SD/MI (Elementary school), involving 42 students and 40 of PGMI students (Education of Islamic Elementary School).
Table 01: Subject of Trial Model Alternative Assessment

School	Learning Model	Class	Number of Students
PGMI students	STS	A	40
MI Darul Huda	Guided Inquairy	IV	18
MIN I Tempel	STS	IV	24
Total			42

This study uses three stages of trials. First, it tested on PGMI students in Tarbiya Faculty of UIN SunanKalijaga Yogyakarta on the subjects of science and learning.Researchers conducted a trial in September 2014. A second trial conducted on Class IV MI Darul Huda Sleman, consisting of 18 people. Then the last is field trials, field trials with a number of subjects about 24 people.

Data analysis was performed using qualitative and quantitative approaches. A quantitative approach is used to determine whether there is difference in the ability of the five domains of science among students in the

learning process using STS learning model with the students in the learning process using guided inquiry learning model. Quantitative analysis is performed with SPSS version 18.

III. RESULT AND DISCUSSION

1. Trial Result I

The first trial conducted on PGMI students in Tarbiya Faculty of UIN SunanKalijaga Yogyakarta, at the time of study and learning of Science. The trial is used to determine the readability and enforceability of learning and assessment of alternative scenarios that already exist. The following are the results of the first test.

a. The implementation of observation sheets science process skills, creativity and the application is still low, at 56%.
b. The assessment of performance is at 65%.
c. The implementation of self-assessment form scientific attitude is at 70%.
d. Learning scenarios (RPP) is still incomplete.
e. Less of execution time (delayed, not according to plan).
f. There are still students that are less active (not working in earnest what is in the assignment sheet).
g. Many of the students are noisy.

Based on the first trial, the revisions are:

a. The number of items in the observation sheet is reduced, because too much so that not all can be observed within the specified time. In addition, the learning process is necessary audiovisual recording, so that it can assist in assessing alternative observations.
b. The improvement of learning scenario, in particularly in the explanation.
c. The conditioning, it needs tools such as a bell or other sound tool, which can help focus the attention of students, so not much time wasted.
d. Teachers should be more active in monitoring all participants, so that all active, especially when students do the task.
e. The number of participants in a class needs to be reduced, so that the maximum is 30.

2. Trial Result II

To see the effectiveness of alternative assessment tools that have been developed, it is necessary to empirical testing through field trials, which in MI Darul Huda Sleman Class IV, by applying it to two learning models, namely Model Guided Inquiry and Learning Model STS.

a. In this field trial on its implementation showed:
b. The implementation of learning scenario (RPP) is on 70%.
c. The assessment of performance is on 71%.
d. The implementation of the observation sheet is on 60%.
e. There are still students who are passive, lazy, and timid.

The results of trials of alternative assessment tools in the learning of science in MI Darul Huda can be seen in the table below.

Table 02. Trial Result II.

MODEL	Concept	Process	Creativity	Attitude	Application
GuidedInquiry	70	90	20	156	24
GuidedInquiry	80	98	25	150	23
GuidedInquiry	78	79	28	140	20
Guidedinquiry	75	95	27	150	26
GuidedInquiry	70	100	24	147	20
GuidedInquiry	80	78	30	137	34
GuidedInquiry	90	70	34	139	36
GuidedInquiry	100	60	30	132	31
GuidedInquiry	60	90	30	132	24
STS	70	108	36	120	34
STS	75	95	36	150	29
STS	70	100	34	147	29
STS	80	78	38	137	34
STS	90	98	34	139	35
STS	100	93	30	132	30
STS	60	110	30	132	32

STS	70	108	36	120	34
STS	90	98	34	139	35

Research data were analyzed using SPSS 18 with multivariate analysis of variance of the lane. Therefore, it is done playing the dialog by selecting Analyze-multivariate general linear model-, with the dependent variable is the concept (cognitive), process skills, creativity, scientific attitude and scientific applications.Based on the analysis, test results of multivariate test of Pillai's Trace acquired F 9.836, p = 0.001, to test Wilks' Lambda obtained price F = 9.836, p = 0.001, test Hotelling's Trace obtained price F = 9.836, p = 0.001 and test Roy's Largest root obtained price F = 9.836, p = 0.001.For the whole of the test obtained by value p <α, so that the multivariate Ho is rejected and Ha is accepted.Therefore it can be concluded that based on multivariate test, there are differences in learning outcomes as measured by alternative assessment between students in the learning process using the learning model Science Technology Society (STS) with the students in guided inquiry learning model.

Based on the results of the univariate test on creativity dependent variable (y3) F amounted to 16.345 with p 0.001, so it can be concluded that there are differences in learning outcomes domain of creativity in students in learning using STS models compared to students in guided inquiry learning model. In the variable concepts, process skills, application of science and scientific attitude there is no significant difference between students in learning using STS models with the students in guided inquiry learning model.

IV. TRIAL RESULT

The third trial was conducted in MIN Tempel in the fourth. There are 24 students. In the learning process, it only uses a single model of learning, i.e, learning model STS.The results were as follows:

a. Implementation of learning scenarios at 75%.
b. Implementation assessment observation sheet creativity, skills, processes, and applications at 76%.
c. Implementation of self-assessment scientific attitude of students at 70%.

V. DISCUSSION

Based on the results of data analysis test II were processed with SPSS version 18, it can be concluded that there were significant differences in the development of the five domains of science to the students in the learning process using the learning model of science technology and society compared to students in the learning process using conventional models.It happens because the learning process STS learningmodel using steps or clear syntax, planned, guided, and enable students to engage in activities that can develop creativity, scientific attitudes and concepts, process skills and the use of the science concepts.

Based on the results of the univariate test, the differences in learning outcomes occur only in the domain of creativity, while the other four domains, namely domain concept (cognitive), process skills, attitude and application of science there is no significant difference.It happened because of the limitations of observation, there are only two observers to observe 18 people, making it less accurate. Besides, it is also because there is a tendency subjectively, ie, that it is almost the same for all students, thus affecting the measurement result.Science is a representation of a dynamic relationship that includes three main factors, namely: "the extant body of scientific knowledge, the values of science, and the methods and processes of science". Science aside viewed as a process and methodsand products (body of scientific knowledge), also see that science contain values.As the body of scientific knowledge, science is the result of interpretation or description of the natural world (the natural world). It is actually the same as the elements of the product on the definition of science proposed by Hungerford, Volk &Ramsey (1990).

Science as a process or method of investigation include ways of thinking, attitudes, and measures the activities of scientists in order to obtain the products of science or scientific knowledge, such as observation, measurement, formulate and test hypotheses, collect data, experiment, and prediction.In that context, science is not just a way to work, seeing, and thinking, but 'science as a way of knowing'.Science as a process can also include the tendency of the attitude or action, curiosity, habits of thought, and a set of procedures. Science as a process can also include the tendency of the attitude / action, curiosity, habits of thought, and a set of procedures. The values of science dealing with moral responsibility, social values are the benefits of science to science and human life, as well as the attitudes and actions (eg, curiosity, honesty, thoroughness, diligence, caution, tolerant, saving, and decision-making).

Basically, the teaching of science as a subject in school would have a significant impact, because it is closely related to: 1) the survival of mankind in this world, in particular those relating to the selection of wise action against global issues (global warming, engineering genetic etc.); 2) the demands of the labor force in the economic environment that is based on science and technology (knowledge based economy). This fact clearly indicates a need that science education in schools should be effective and relevant for the majority of the

population as well as for various groups of different (gender, economic background and social, ethnicity, location, etc.). In other words, 'science for all' does not mean 'one-size-fits-all' (Atkin : 2001)

There are three main focus of teaching science in schools, which can be: 1) the products of science, namely the provision of a wide range of scientific knowledge that is considered important for students to know (hard skills); 2). Science as a process, which concentrates on science as a problem-solving methods to develop students' skills in problem solving (hard skills and soft skills); 3). Attitude, approach and its scientific value and finesse Insaniah (soft skills).A science teacher or curriculum designer will view that there are three components essential in the teaching of science to develop students' understanding of science. However, the view of how the right proportions of each of these approaches is debatable.

When scientific knowledge continues to grow ahead that contains a variety of explanations and exposure to a variety of revelation that has been validated by scientists, it is only a small part of the things that can be taught in schools. The resultsof this selection are likely to be a simplification of the views of various scientists in an effort to make science more easily understood by students. This selection results appear in the form of school science teaching curriculum documents as well as the syllabus, textbooks, student worksheets and laboratory experimental procedures.

The subject matter of science by science curriculum designers introduced sequentially and continues as a preparation for the lesson at the next level.The purpose of the teaching of science as the product is to develop students' conceptual understanding of science.Lesson content includes facts, concepts, principle, laws of nature, models and theories that form the formal knowledge of science.Besides, there are also a variety of problem-solving exercises both written and laboratory trials generally have a single answer.

The actual relationships of the subject matter in science at school are not always the same. This is because the student's age and background knowledge are limited, so most of the contents of textbooks are an abbreviated version of the science knowledge that is valid at a certain time or a limited version of view of science to date.In fact, very little of the material science that taught in schools is a valid version among scientists today.Science as a process has a different approach to science as a product (Yager, 1991). Its main focus is in the effort of science to solving particular problems.In general, this means that students are encouraged to use the skills possessed as well as the skills and expertise of scientists in solving scientific problems. The expertise and skills are very valuable for students both to understand the science lessons and outside the context of the lesson.

The teaching of science as a process requires changes in teaching methods of teaching science as a product pattern. Teaching science textbooks are usually used in the teaching process is well structured sequence, where knowledge is planned to be understood by the student,the teaching of science as a process is implementing ateaching unstructured.It will be more difficult and requires expertise and skills to organize it. The students are expected to be involved individually or in small groups to make their own plans. The setting is on the students, while teachers as facilitators.

This teaching pattern feels threatening the authority of the teacher.When a teacher teaches a pattern of text books, he set a goal of learning and knows the exact subject matter that will be given.However, students are taught the scientific method as a process and dealing with the real problems will raise the question that will not be easily answered, and may actually there is no answer that can be known for certain.

Attitude approach, scientific value and finesse Insaniah can be done in two different emphases.The first involves efforts to develop this attitude. It is as a scientist properties which help students to resolve the similar issues as well as scientists finish.Some attitudes include the following: 1) know the need for proof before making claims to knowledge, 2) determine the quickness to be careful when interpreting the results of the experiment or observation, 3) a willingness to consider other interpretations are also plausible, 4) a willingness to perform trial activity carefully, 5) willingness to check the evidence and interpretations, 6) recognizing the limitations of scientific inquiry.

The second emphasis is to develop special attitudes towards the environment, subjects other than science or the basis for a future career as well as attitudes towards science.Attitudes such as: 1) curiosity about the physical world and the biological and how it works, 2) realization that science can contribute to address the problem of individuals and globally, 3) an enthusiasm for scientific knowledge and his methods, 4) an acknowledgment that science is a human activity and it is not something mechanical, 5) a recognition of the importance of scientific understanding in the modern world, 6) the fact that scientific knowledge could be used for the purposes of good or evil, 7) an understanding of the relationship between science and another human activity 8) a recognition that knowledge and understanding of science is different from that done daily.

Attitudes and skills above clearly related to science, and will potentially continue to grow, especially when students are engaged in science lessons in school. However, there are also other positive attitudes which a science teacher can also reinforce and strengthen it as a sense of responsibility, willingness to cooperate, tolerance, confidence, respectful to others, freedom, trustworthy and intellectual honesty. A variousInsaniah proficiency is very important to make graduate school more valuable in a rapidly changing world. It has long been recognized that the provision of technical knowledge is not considered enoughbecause of the rapid

development of science and technology,so Insaniah graduates become competitive side.The development of these attitudes is usually an indirect consequence of the whole experience at school and in the outside world.No teacher or set of activities that will be responsible for students' attitudes towards science, but this needs to be done continuously, planned and sustainable.Research in education, for example, shows how strong the effect of hidden curriculum content of curriculum materials compared to the views of students against themselves, teachers, schools and the educational process.However, despite the change in attitude is slow compared to the increase of knowledge. The measurement is also difficult, this does not make that it is very strategic for effectively planned.

Individual and social skills approach is to develop students' potential. Science is not to be in a unique position to contribute to the development of proficiency, but all teachers should develop students' individual abilities such as persistence, as well as social skills such as cooperation. If you as a teacher believe it, then it will be visible from the planning of teaching science and teaching methods that you practiced.Science thought important to know because this knowledge will provide a deeper understanding of the science's progress today. A historical angle is part of the spectacular events that science has achieved.Thus we get a better awareness on the truth of man's knowledge of modern science as the development of science.The development and growth of human thought in philosophy and science also needs to be studied. As an example of splitting the atom as modern knowledge, is thinking of the source of Democritus atomic hypothesis that has been known since antiquity.In the development of science, classification of knowledge on a variety of subjects such as Physics, Chemistry, Biology and others are needed to be studied.Throughout history, humans have developed a relationship to theworld of the physical, biological, psychological, socials and validate them. Such ideas have allowed the formation of a generation that managed to obtain a comprehensive understanding of humans and the environment.The means used to develop such ideas are such a special way, researching, thinking, doing experiments, and makes validation.It represents a fundamental aspect of the nature of science and reflects how science tends to differ from other kinds of knowled

VI. CONCLUSION

The conclusions that can be drawn based on the three trials are:

a. Alternative assessment models consisting of a performance test, the assessment sheet process skills, creativity and applying. It is on 70% so that used in science learning in MI.Nevertheless there are still weaknesses, which are difficult to use on a large class, the observer is needed more than 2.
b. There is a significant difference of five domains of science learning outcomes among students in the learning process using the learning model Science Technology and Society (STS) with students in the learning process using guided inquiry learning model. On students who use STS learning model, learning results higher than those of students in learning using guided inquiry learning model. The difference lies in the domain of creativity, while in the domain concepts, process skills, scientific attitude and the application of science is not a significant difference.

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