

## **Exercising Junior High School Students' Science Processing Skill In Natural Science Learning**

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**Abstract:** *The ability to build a concept or thought in natural science learning context can be conducted by applying science processing skill-based learning at class. The content of observing and experimenting skill appears more in laboratory that it does at class. This research describes the process of exercising observing and experimenting skill. This research uses qualitative approach with descriptive method. The subject of the research is students of VIII A grade of SMPN 1 Martapura and also involves one science teacher teaching at that class. The data is collected through observation, interview, and documentation. The data analysis uses interactive model stated by Miles & Huberman. The result of the research shows that to train or exercise the observing and experimenting skill on students, the teacher should design every lesson at class emphasizing on practicing and scientific work.*

**Key words:** *science processing skill, qualitative approach, interactive model.*

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### **I. Introduction**

The learning of natural science could be more meaningful if the students are given the chances to express their own thoughts and are actively involved in discovering a concept of the phenomena around. Thorough that process, the students will obtain experience directly, that it can optimize the ability to accept, save, and apply the concepts learned. As based on Dufresne et al (1996: 5), the teaching of sciences –while natural science learning is one of those- observed by constructivist perspective should enable students to learn actively, while students are engaged in writing, speaking, describing, explaining, and reflecting.

The science processing skill can be said also as thinking skill. According to Zaini & Asnida (2015: 134), it is explained from the result of the clinical supervision of the lesson plan instrument made by natural science teachers of SMP in Kabupaten Tanah Bumbu, the critical thinking skill has not been the main part in learning yet. The learning only emphasizes on the concept mastery, and are not yet directed to thinking skill mastery.

Based on the former study, the observing and experimenting skill are more likely to appear in laboratory learning compared to classroom learning. Based on the fact, this research is conducted to answer the research problem; how is the process of exercising the students' observing and experimenting skill on natural science learning at school?

According to Semiawan et al (1989:19), observing is different with watching or seeing, in an observation we sort the important and unimportant things by using all senses we have. Based on Trianto (2008: 73), observing is the use of sight, hearing, tasting, touching, and smelling. While for Sudarisma (2010: 240) the observation skill covers various activities which involve the use of senses through: the sight, hearing, smelling, tasting, and touching. Those skills involve using relevant and adequate facts from observation result.

The observation will be scientific if it is conducted precisely and enables all senses in the process of observing. Empowering all senses means to conduct the scientific observation by observing one object from various point of views, it is to obtain more information about the object.

Experimenting is an effort to examine or test through practical investigation. A person who is not good at doing experiment often tests his ideas by conducting trial and error (Semiawan et al, 1989:26). According to Trianto (2008: 76), an experiment is a test about hypothesis or prediction. In one experiment, all variables should stay the same except one, which is the variable of manipulation.

An experiment or a trial is an action to test hypothesis or temporary speculation. A student who is competent to create one hypothesis related to learning material at school can be taught to conduct experiment.

## **II. Method**

The sample/subject collecting process in this research uses purposive sampling technique. The research procedure covers preparation stage and execution stage. The research approach is qualitative with descriptive and field based method (field research)

The technique used in collecting the field data is observatory technique, interview, and documentation. Next, the data is triangulated so it is integrated one with another. The data collecting in this research is the primary data originated from the field research, then it is combined with the data from literature study. The data analysis refers to interactive model by Miles & Huberman.

This research is conducted only in one class, the class of VIII A Junior High School 1 Martapura. The sample/subject of the research is the natural science teacher and the students of VIII grade of Junior High School 1 Martapura. The teacher and the students have used the scientific approach according to science processing skill.

In testing the the validity if research result, three stages are prepared 1. Credibility testing 2. Dependability testing, and 3. confirmability testing

## **III. Result And Discussion**

The result of observation in this research covers description from three kinds of data, they are (1) observation data, (2) interview data, and (3) documentation data.

Based on the observation data, some indicators of teacher's activities in exercising the observation skill are (1) teacher should actively wander around every group during the observing process to control students' activity, (2) teacher should explain the techniques of observation and which sense can be used while observing process orally or written on students' worksheet, (3) teacher should provide real or concrete object for observation, (4) teacher should form heterogeny gender-based group in observation, (5) while observing process, teacher should teach the students how to calculate, measure, classify, and relate the students about the relationship of space/time.

From all the indicators explained, approximately 60% of the teachers are competent to conduct the exercising process, the aspect still need to be improved is the part when the teacher should explain precisely about which sense used in the process of the observation, and when the teacher should teach about calculation, measurement, classification, and the relationship of space/time. Even though, the procedure of observation is clearly seen in students' worksheets. Therefore, the teacher's ability in exercising the observation skill to students is valued as 'fair'.

Based on the result of observation, the indicators of teacher's activity in exercising the experimenting skill are (1) teacher should train the students in several days before the experiment is conducted (2) before conducting the experiment, teacher should reexplain the things related to the the experiment, because it is possible that the students forget the explanation some days ago (3) teacher should keep the students discipline while doing experiment, (4) teacher should actively wander around to every group to control the experiment activity conducting by the students, (5) if there is an unfocused student while the process of experimenting, teacher should give advice and motivate the student, (6) teacher should train the students in making hypothesis, (7) teacher should train students in planning the experiment before conducting the experiment, (8) teacher should teach the students about scientific methodology. Based on the stated indicators, it can be concluded that the teacher is competent in carrying out 5 out of 8 indicator or 62,5%, therefore the teacher is valued 'fair' in exercising the experimenting skill to students.

About the experimenting skill, the interview data result in this research is if the teacher intends to train the students the experimenting skill, there are some things should be done; (1) a good preparation before doing experiment, the preparation could be in the form of giving direction to the students several days before conducting the experiment, the direction covers the concepts should be learned, tools and materials used, and the technical works doing while experimenting, (2) rechecking the students' understanding towards the upcoming experiment. Rechecking could be in the form of concept understanding related to the upcoming experiment, or technical works during experiment.

Based on the observation of lesson plan instrumen, syllaby, and students' worksheet used by the teacher, the researcher stated that those documents can facilitate the teacher to exercise observing and experimenting skill. While the researcher also suggests to improve students' worksheet and make it more interesting, so that it can draw students' attention. However, generally all the documents used are good.

The observing skill is a competency where the senses are required to be optimized, to obtain the scientific data. According Howe and Jones (1993: 132-133), one principle of scientific observation is to use many senses in observing certain circumstances.

According to Sheeba (2013:113), an observation is only a note of sensory experience which can be defined as collecting information about one object or situation thourgh the use of one or combination of five base senses: sight, haring, touch, taste, and smell.

The stimulation given by the teacher, is in the form of explanation about the techniques in observing and which sense used in the process of observation, it can be one motivation for the students. According to Tuan et al (2005:648), stimulations in learning environment have contribution towards students' learning motivation. One way to motivate students in learning is by questioning the students. While making questions, a teacher should pay attention to situation and condition at class so that the questions become effective for the students. Based on Beatty et al (2006: 38) the effective questions should be design with three aims, they are content direction, process purpose (cognitive), and metacognitive purpose. The content direction is the material or topic that has to be mastered, generally it is conceptual. The process purpose is some instruments about cognitive skill developed in the process of learning. Metacognitive purpose is the perspective or point of view about the learning itself.

Experimenting is the process of testing through practical investigation. A person who is not really good in doing experiment often tests the ideas by using trial and error activity (Semiawan dkk, 1989: 26). Based on Sheeba (2013: 19), experimenting is systematic approach to solve a problem. Usually experimenting is identical to scientific method.

The students' high curiosity can also enhance students' motivation to do experiment. Therefore, teacher should stimulate students' curiosity by bringing out the problems familiar to the students, but they still related to learning material. According to Wang (2007:171), curiosity is a response towards new spectacular idea enhancing the students to do the discovery.

#### **IV. Conclusion**

Based on the research result, the teacher is valued as 'fair' in exercising the students' observing skill. The teacher is not seen to teach the activities of calculating, measuring, classifying, and about the relationship of space and time. The teacher's procedure in exercising the observing skill to the students is by providing real and concrete observation object, then the teacher gives direction orally or written about the techniques of observation, and which sense can be used in observing.

On the activity of exercising students' experimenting skill, the teacher is valued as 'fair' also. The teacher is not seem to teach the students making hypothesis, planning experiment, and make students understand about scientific method. The teacher's ultimate way to exercise the experimenting skill to the students is by giving detail and repeated explanation about the things will be done in experimenting activities. Besides, the teacher is also actively wander around to every group during the experiment to control the students' activity and give addition explanation if there is still not understood by the students.

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