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ANALYSIS OF PROCESS SKILL AT JUNIOR HIGH SCHOOL: THE USE OF INQUIRY HIERARCHY

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ABSTRACT

The study aimed to analyze process skill on the use of hierarchy inquiry at Junior High School, using Descriptive Research Methods. The study focused on learning process using four hierarchy levels with sample of a class at Junior High School in which each learning level produced different process skill. The analysis was done by observing the process skill and supported by addition data in form of implementation of learning process that brought out the process skill, analysis of Lesson Plan (RPP), students questionnaires and interviews. The average percentage of four process skill is at low category in the implementation of inquiry hierarchy encourages to be striven for the improvement of teachers' inquiry ability and development learning process to use inquiry because it gives impact of the improvement of students' process skill which is the key for the improvement of students' scientific literacy.

1. INTRODUCTION

Serious problems being faced by the nation of Indonesia is the current education system is too oriented to the development of the left brain (cognitive) and pay less attention to the development of the right brain (affectional, empathy, and taste). The learning process is passive and stiff but it also makes the process of learning to be very unpleasant and full load (Rustaman, 2010).

BSNP (2006) states that to support science learning as a process, product, and scientific attitude of students, then it should be carried out inquiry science learning science (scientific inquiry). Wenning (2004) states that scientific inquiry is an activity hierarchy. Further Wenning (2010b) suggested that because of this hierarchy is a hierarchy, then the higher level can only be achieved if the level below it can be mastered. Lowest level in the hierarchy of this inquiry is one of its most fundamental level of Discovery Learning, followed by Interactive Demonstration, Lesson Inquiry, Inquiry Labs, and the highest is Hypothetical Inquiry.

This hierarchy at every level inquiry has intellectual experience and skills of different processes that can be achieved by students. Each time the student passes a new level of inquiry, the students also have mastered the intellectual experience and skills are more complex processes (Wenning, 2010a).Intellectual experience is experience that is expected from the students during the learning process. Wenning (2010a) revealed that students' intellectual experiences can be translated into the kinds of skills that the students in each level of the hierarchy consists of a Rudimentary Skills, Basic Skills, Intermediate Skills and Integrated Skills. The higher level of hierarchy levels, the type of process skills even higher. Schlenker (Joyce, et al. 2000) also mentioned that the model of inquiry can improve student process skills, the creativity of students, and students become skilled in obtaining and analyzing information.

The purpose of this study was to describe the process skills in the hierarchy of four levels of inquiry that includes skills the learning in Discovery Learning that brought out Rudimentary Skill, Interactive Demonstration Learning that brought out Basic Skill, Inquiry Lesson Learning that brought out Intermediate Skill, and Inquiry Lab (Guided Inquiry) Learning that brought out Integrated Skill process.
2. RESEARCH METHOD
The method used in this research is descriptive. According to Sukmadinata (2008) study is a descriptive study that describe or depict phenomena that exist, either a natural phenomenon or human engineering. Descriptive research is research that describes just what it is about a variable, symptoms or conditions (Arikunto, 2003). The subjects used in this study were students of class VII-E consisting of 38 students in the academic year 2012/2013.

3. RESULT AND DISCUSSION
3.1. Learning Process
The learning process for a four-level hierarchy implemented sequentially, starting from learning Discovery Learning, and Interactive Demonstration, Inquiry Lesson, and terminated by the Inquiry Lab. On the whole learning process, the implementation of the learning process is carried out by four student teachers, each of which will carry out the process of learning in each hierarchy level inquiry. The observation of the learning process can be seen in Table 1.

Table 1. Comparison of the Learning Implementation Each Level Hierarchy Inquiry

<table>
<thead>
<tr>
<th>SintaxLearning</th>
<th>Inquiry Hierarchy</th>
<th>Discovery Learning</th>
<th>Interactive Demonstration</th>
<th>Inquiry Lesson</th>
<th>Inquiry Lab (Guided Inquiry)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>Category</td>
<td>%</td>
<td>Category</td>
<td>%</td>
</tr>
<tr>
<td>Observation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2. Result Analysis Lesson Plan (RPP)
Four learning outcomes analysis conducted, all have good and very good criteria, meaning that lesson plan made by the student teachers already meet the requirements of making a good lesson plan.

Table 2. Analysis of the results of learning Implementation Plan (RPP)

<table>
<thead>
<tr>
<th>No</th>
<th>Inquiry Hierarchy</th>
<th>Percentage</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Discovery Learning</td>
<td>91%</td>
<td>Very Good</td>
</tr>
<tr>
<td>2</td>
<td>Interactive Demonstration</td>
<td>88%</td>
<td>Very Good</td>
</tr>
<tr>
<td>3</td>
<td>Inquiry Lesson</td>
<td>78%</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>Inquiry Lab</td>
<td>97%</td>
<td>Very Good</td>
</tr>
</tbody>
</table>

3.3. Questionnaire Results
The questionnaire consists of questions with answer choices "yes" and "no" are used to obtain student feedback about the learning process by using a hierarchy of inquiry and student responses on the skills he had done as an additional ingredient in the analysis of process skills that will be analyzed. Recapitulation of a questionnaire completed by the students are as follows:
Figure 1. Summary Diagram Student Questionnaire Results

<table>
<thead>
<tr>
<th>Percentage</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>82</td>
<td>84</td>
<td>79</td>
<td>71</td>
<td>89</td>
<td>76</td>
<td>82</td>
<td>53</td>
<td>84</td>
<td>71</td>
<td>67</td>
<td>82</td>
<td>92</td>
<td>97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>16</td>
<td>29</td>
<td>21</td>
<td>29</td>
<td>11</td>
<td>24</td>
<td>18</td>
<td>47</td>
<td>16</td>
<td>47</td>
<td>29</td>
<td>33</td>
<td>18</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>

Description:
1 = Observing
2 = Formulating concepts
3 = Forecasting
4 = Draw conclusions
5 = Explaining
6 = Communicating results
7 = Classified result
8 = Making estimates
9 = Collect and process data
10 = Identify and analyze the information and models that lead to changes
11 = Collect and record data
12 = Make a data table
13 = Design and conduct scientific investigations
14 = Use of technology and mathematics during the investigation
15 = Describe the relationship
16 = The process of learning

Based on Figure 1 can be seen that in general students responded positively to the process skills that can be perceived by students already mastered.

3.4. Hierarchy Process Skills in Inquiry

Results of the observation sheet process skills that have been made on the implementation of the four level hierarchy of learning inquiry show the following results:

Table 3. Recapitulation of the Four Skills Level Hierarchy Process Inquiry

<table>
<thead>
<tr>
<th>Inquiry Hierarchy</th>
<th>Process Skill</th>
<th>Percentage Process Skill</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovery Learning</td>
<td>Rudimentary Skill</td>
<td>50.5%</td>
<td>Low</td>
</tr>
<tr>
<td>Interactive Demonstrative</td>
<td>Basic Skill</td>
<td>63.2%</td>
<td>Enough</td>
</tr>
<tr>
<td>Inquiry Lesson</td>
<td>Intermediate Skill</td>
<td>46.5%</td>
<td>Very Low</td>
</tr>
<tr>
<td>Inquiry Lab</td>
<td>Integrated Skill</td>
<td>76.8%</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>59.3%</td>
<td>Low</td>
</tr>
</tbody>
</table>

Table 3 shows that the use of the hierarchy at the level of unity to the second level there is a rise in the percentage of process skills, but on the third level of the hierarchy that percentage has decreased process skills. At the fourth level of the hierarchy, the percentage again increased process skills, process skills and even the percentage is the highest, reaching an average of 76.8%. The average percentage of process skills of inquiry on the use of this hierarchy is 59.3% with a low criteria.

3.5 Discussion

Based on observations carried out at the skill learning process that uses a hierarchy of inquiry obtained an average emergence process skills with sufficient criteria. At Discovery Learning process percentage emergence Rudimentary Skill is 50.5% with less criteria. Rudimentary Skill is skill process which according to Funk (Dimyatı and Mudjiono, 2002) is a basic skill, where the basic skills include activities associated with the observation, classification, measurement, communication, prediction, inference. This shows that if in the learning stage by using Discovery Learning Skill skills expected Rudimentary process has not been reached, then the process skills Basic Skill will be difficult to
achieve because it has a higher level of difficulty. It is apparent from the third level of the hierarchy is the stage where the Lesson Inquiry learning process skills that percentage rose at the second hierarchical level by 63.2% with sufficient criteria, down to 46.5% with less criteria once, but in the fourth skill level increases again in the process percentage of 76.8% with both criteria. Students will be able to master the skills of the Basic Skill if he has been accustomed to do Rudimentary skills Skill, and students can master the skills Intermediate Skill if he was able to master the skills Rudimentary and Basic Skill, and so on.

One of the factors that influence students' process skills is the ability of teachers to use inquiry in the learning process. Application of learning to use inquiry is not easy. Joyce, et al (2000) states that there are two important issues in the application of scientific inquiry. The first is that teachers are required to apply scientific inquiry tools to learn intensively about the academic material to be taught and teachers' mastery of the knowledge of scientific inquiry. The second is that scientific inquiry learning can be implemented well and showed satisfactory results when the teacher's knowledge about learning academic material and very adequate. This means emphasizing the important role of teachers in learning process that will use scientific inquiry.

Another factor is the influence of teachers in teaching techniques and teaching experience of teachers. The results of interviews with teacher custodian at the school science lessons, it turns out that the learning process done by him is still rarely use inquiry learning, so it give the impact on the results of the study, because the students have not been used to perform the process-skills that are expected to do.

4. CONCLUSION

The results showed that the use of a hierarchy of Discovery Learning inquiry on the learning process Rudimentary Skill bring skills that are at once less category. Interactive learning skills demonstration that led to the Basic Skill with enough categories. Inquiry Lesson learning skills that led to the Intermediate Skill with less criteria once, and for learning Inquiry Lab (Guided Inquiry) that gave rise to the Integrated Skill skills gained both criteria. The average percentage of the four process skills are in enough categories.

The researcher suggest that the teacher needs to have adequate scientific inquiry skills to support the implementation of the learning process so that the use of optimal hierarchy of inquiry can take place, and the development of learning that uses a hierarchy of inquiry to increase students' process skills.

REFERENCES