Application Task-Based Learning (TBL) in Developing
the Critical Thinking Skill of Students at Nature Indicator Determination

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Abstract

TBL (Task-Based Learning) method is a study method that gives different role task to students. The important roles of TBL method are planner, information collector, data organizer, scheme designer, experiment preparation and presenter. The application of TBL method is to find the development of critical thinking skill and how active the student role in learning nature indicator determination. The research uses the method of class research with subjects are 30 students grade XII Science 2 Mekar Arum Senior High School Bandung. The used instrument is a test of critical thinking skill within student task paper and student observation format. In organizing data, the researcher identifies the result of test of critical thinking skill within role task in student task paper and student observation format, and then they are in group based on previous daily test achievement group. After that, the researcher counts the average value and then turns the result into percent and be interpreted. Based on the result of research, it gets the conclusion that learning in decision indicator nature by using TBL method is excellent. From the average value of critical thinking skill shows the highest group get (81) for excellent, the middle group get (77) for good, the lowest group get (75) for good. Besides, the average value of student activity shows the highest group get (88) for excellent, the middle group (89) for excellent, and the lowest group get (88) for excellent.

Keywords: TBL (Task-based Learning) method, Critical Thinking Skill, Nature Indicator

Introduction

Chemistry plays an important role in efforts mastery of science and technology such as the improvement of agricultural products, controlling the spread of diseases and other (Petrucci et al., 2011. Chang (2005) said that the science of chemistry is often considered more difficult than other sciences. This is because some of the concepts in chemistry are abstract. In addition chemistry also has a highly specialized vocabulary, so studying chemistry is like learning a new language.

One of the chemistry learning materials given to high school students of grade XI in the second semester is the naturals indicator. This material is very related to daily life. But based on information obtained from chemistry teacher in Mekar Arum High School Bandung, natural indicator material sometimes is not studied in depth. As said by Siberman (2010), most teachers feel strapped by the subjects and depressed by the time to teach it so that most of them have the assumptions must complete the learning without without considering the

learning process. This leads to a lack of students' understanding of these subjects. As a result, students are less capable of connecting learning concepts with life in the environment.

Other findings based on a preliminary study conducted by researchers and other information obtained from the teacher of high school chemistry Mekar Arum Bandung, that students of class XI IPA 2 SMA Mekar Arum Bandung less active in studying theories of chemistry but in other cases they have a tendency to ask about the chemistry phenomena that occur in the environment outside of learning. According to Arifin et al., (2003) that asked is one indicator of critical thinking. So it can be said that high school students of Mekar Arum Class XI IPA 2 already have the basic skills of critical thinking. But it is necessary for the development of critical thinking skills so that they are more logical and able to resolve any problems occurring in life.

Task-Based Learning (TBL) is a learning method that gives a different role assignments to students in one group (Zhou et al., 2013).

Theory

Task-Based Learning (TBL)

Task-Based Learning (TBL) is a learning method that gives freedom to the students to construct his own knowledge, identify, manage problem solving and determine the source of information that can be trusted to solve the problems being faced in learning (Zhou, et al., 2013). Characteristic of the TBL method is giving the task of different roles within the group. The role assignments are as follows.

Table 1. Role Name and Task

No	Role	Task
1	Planner	Tasked to organize members of the group, schedule and supervise the implementation of learning tasks and supervise group members learning that takes place in small groups.
2	Spooler	Tasked to collect information or data, such as physical or chemistry properties or matters related to natural indicators.
3	Data organizers	Tasked to formulate information or data that have been obtained and arranged systematically.
4	Schema designer	Tasked to make the experiment work step of determining indicators that can be used.
5	Laboratory assistant	Preparing tools and materials which have been defined by the schema designer.
6	Presenters	Tasked to present what has been obtained in the group.

The implementation of TBL methods can encourage students to be more active, because a given task requires them to explore on their own knowledge to be obtained. Knowledge is built through cooperation between members of the group in completing a given task (Zhou et al., 2013). Nevertheless, it remains every student has different characteristics in the process of learn something (Budiningsih, 2011). So it is possible if there is a difference between the activity of the student with other students.Teori yang Melandasi *TBL.*

Piaget and Constructivism Flow

Piaget (in Sagala, 2012) argues that learning is not only to remember and individual circumstances are passive, but learning is acceptance of knowledge that is formed when individuals perform an action such as seeing, touching and adapt that cause changes in the understanding as a form of interaction with the environment.

Learning Theory Invention Bruner

Bruner (in Sagala, 2012: 36) revealed that the activity of students in finding can raise the motivation of students in the learning process and the working facing the natural in order to produce the expected answers.

Research methodology

The method used is class research. Subjects in this research were students of Mekar Arum High School XI IPA 2 Semester II Academic Year 2014/2015 which consisted of 30 students. Research conducted at Mekar Arum High School, Bandung on Wednesday and Thursday 24-25 April 2015. The time used was 2 meetings ie 2 x 45 minutes. The instrument used is the format of the students observation and tests critical thinking skills and their role in the task of LKS. Techniques in data collection are shown Table 2.

Table 2. Data Collection Techniques

Data	Data Collection Techniques	Description
Student activities	Format of observation and the task	Carried out during learning
Critical Thinking Skills	Test critical thinking skills and their role task	Implemented after learning

Data Analysis

Student Activity Data

The step of data processing is carried out as follows:

Identify the format of the students observation that has been filled.

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2. Provisions appraisal observation format is: value = score obtained.

3. Value format is converted into the form percent observation and summed with the percentage of role assignments.

4. Calculates the average value of the overall activity of the students is based on the same role assignments and make a diagram.

5. Averaging the value of the overall activity of student achievement based groups and create the diagram.

6. Interpret the final value of student activity with the following conditions.

Table 3. Interpretation of Students' Activity

No.	Percentage Category	Interpretation
1	80-100	Very Good
2	66-79	Good
3	56-65	Enough
4	40-55	Less
5	30-39	Failed

(Arikunto, 2007)

Data Critical Thinking Skills

Data obtained from tests of critical thinking skills is processed by the following stages:

1. Identifying the answer sheet that has been filled by the students.

2. Provide student scores on the answer sheet in accordance with the key answers that have been prepared.

3. Summing scores of each student.

4. Averaging the written test scores of students based on achievement group.

5. Add the result to the task of the student's role in LKS and divided by two.

6. Interpret the results with the provisions as in Table 3.

7. Make the students' critical thinking skills diagram for each group achievement.

Discussion Results

Student Activity

Based on the analysis of the obtained average value of student activity. Afterwards grouped by task the same role and averaged. The results are presented in the following table.

Table 4 The Average Score of Students' Activity Based on Role Task

No.	Role	Average Score	Interpretation
1	Planner	91	Very Good
2	Spooler	88	Very Good
3	Data organizers	89	Very Good
4	Schema designer	88	Very Good
5	Laboratory assistant	92	Very Good
6	Presenters	86	Very Good

Visualization of the Table 4 above shown in Fig. 1

Fig. 1 The Average Score of Students' Activity Based on Role Task

Based on the above diagram, Laboratory assistant received the highest score is 92. While the value of the lowest role assignment is the presenter of 86. This is presumably due to convey the results of experiments using the good and correct sentence is more difficult than doing the work that has been listed in the procedure. The average value obtained information gatherers is 88. This value indicates the results are quite low compared to the planner is 91. The value of the planner does not affect the value of the other role assignments, but only affect the smooth running of the learning process. In contrast to the value of collecting information, the task of this role affect the schema designer. When the information received incomplete, the planning of the experiment measures would be less than perfect. The low value of the information-gathering does not significantly affect the value of the organizers of the data, because the duties of this role is to sort and make systematic information obtained.

The high value of the activity of each task illustrates the role that the TBL method can make students actively in learning. Zhou et al. (2013) said that the use TBL method could encourage students to be more active. The reason is because in this TBL method students are given problems to be solved so that students are motivated to solve these problems. This is in line with the said Bruner (in Sagala, 2012) that students will be active in the learning process when stimulated to find answers to a given problem.

The next step is calculating the average value of student activity based on group achievement. The achievements group is determined from the previous daily test scores obtained from chemistry teachers in Mekar Arum high school Bandung. The average score of student activities can be seen in table 5.

Table 5. Average Value Student Activity Based Performance Group

No	Achievement Grup	Average score of activeness	Interpretation
1	High	88	Very Good
2	Medium	89	Very Good
3	Low	88	Very Good

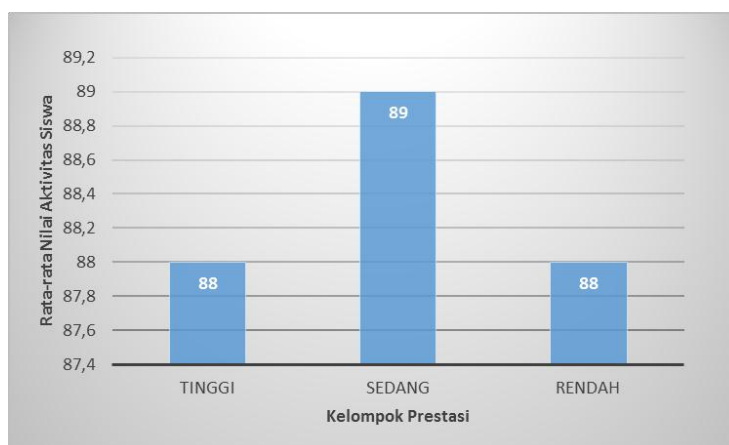Visualization of the Table 5 above shown in Fig. 2

Fig. 2 Average Score Student Activity Based Performance Group

In the diagram above it can be seen that the average value of the activity of students in each group achievement is ≥ 80 showed very good predicate. But even so, there are differences in values obtained each group achievement. The above diagram illustrates the activity of students in the group were better achievement than active students at high and low achievement groups. This is presumably because the characteristics of each student is different so that their activeness in learning any different. As stated by Budiningsih (2011: 166) that students have different characteristics in the process learn something. So it was no wonder when there is a difference value between the activities of a group of high achievement, medium and low.

Developing Critical Thinking Skills

After going through the data analysis of the obtained average value of critical thinking skills of students for each group achievement as follows.

Table 6. Average Value Critical Thinking Skills Based Student Achievement Group

No	KP	Average of Evaluation Test	% TP	NA	Success Rate
1	High	71	91	81	Very Good
2	Moderate	63	91	77	Good
3	Low	59	92	75	Good
Rata-rata		64	91	78	Good

Description

KP = Group Achievement

% TP = Percentage Task Roles

NA = Value End

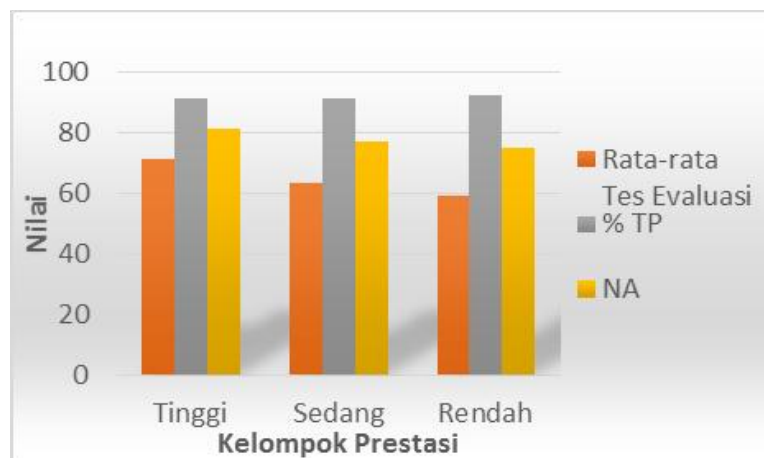Visualization of the Table 6 above shown in Fig. 3

Figure 3. Average Value Critical Thinking Skills Based Student Achievement Group

The average value of each group obtained final achievement showed good results. The average value is higher than the average value of daily tests beforehand. The average value of daily tests prior to high achievement group is 80, is a group achievement was 70.84 and for the low achievement group is 60. After the conducted study showed the average value for the high achievement group is 81 with the criteria very well. As for the achievements of the group being was 77, the low achievement group is 75, both are predicated either. This result was obtained because the students actively participate in learning so that the understanding of the material and critical thinking skills, the better. As said by Piaget (in Sagala, 2012: 25) that knowledge is not formed with a passive individual circumstances, but by an act of exchanging ideas especially that caused the child develops reasoning skills while experiencing the dissenting opinions.

Conclusion

Use TBL method to develop critical thinking skills of students in the learning determination of natural indicators.

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