SHARING TASK AND JUMPING TASK LESSON DESIGN IN LAW OF DEFINITE PROPORTIONS CONCEPT

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Abstract: The various student’s competencies in learning is a challenge for teacher to create effective learning for each student. Therefore, a teacher must have a didactic skill to treat student’s responses with various competencies. One of the ways to treat this matter is to make sharing task and jumping task learning design where students learn text book level learning material (sharing task) and jumping material beyond text book level (jumping task). This research is aimed to create sharing task and jumping task learning designs that solve the challenge in learning law of definite proportions. The subjects are 62 senior high school students of SMA Laboratorium UPI grade X IPA 1 and X IPA 2. This research employs descriptive qualitative method. The instruments of the research are TKR (Tes Kemampuan Responden), observation sheets, and interview guidelines. There are two implementations in this research. The findings in the implementations are the interaction between students and students with teacher in sharing task is more optimal than of jumping task, students are challenged and can answer jumping task problems; and learning difficulties still occur in the first implementation. Revised learning design in the second implementation can make the students’ interaction more optimal. The interaction does not only happen in their own group but also interaction between groups. Furthermore, learning difficulties can be minimalized.

Keywords: Conceptual Change Text, Zone of Proximal Development, Actual Development, Potential Development, Fundamental Laws of Chemistry.

1. INTRODUCTION

The quality of teaching is a major challenge for Indonesia to improve the quality of education. One indicator of the quality of education can be seen from the results of TIMSS and PISA. Indonesia's participation in the International study Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment shows that the achievement of Indonesian children are not optimal in some reports. Indonesia's participation in the study: International Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA) since 1999 shows that the achievement of Indonesian children are not optimal in some reports on TIMSS and PISA.

One of the efforts made by the government to improve the quality of education is to change the curriculum of Curriculum 2013. Completion of the SBC be made in the curriculum in 2013 include the changes in the paradigm of the learning patterns which initially centered on the teacher into a pattern of student-centered learning, learning patterns one direction (the interaction of the teacher-student) into an interactive learning (interactive teacher-learners-community-natural environment, source / other media), learning patterns isolated into learning for learners to gain knowledge from anyone and from anywhere that you can be contacted and obtained via the internet, learning patterns passive to active learning-looking approach is reinforced by learning model of science, learning patterns themselves into study groups.

Another step to improve the quality of education changing the curriculum is to improve the quality of students, teachers, materials, classroom learning process and environmental conditions. Among
some of the variables that influence the achievement of learning outcomes learners are teachers. Teachers are the ones who interact with students while in school. Teacher in charge to plan the learning process, implementing the learning process, assess learning outcomes, conduct guidance and training. Therefore, teachers must have professional competence, didactic, personal and social.

In addition, it needs to be done is to create an effective learning process. Effective learning process is characterized by two-way communication between teachers and learners who are not only the learned but how it should be studied. Ariffin et al (2000) suggest that the learning process is a process of active communication interaction between students and teachers in educational activities. In learning activities there are students learning activities conducted and no teaching activities that teachers do. Both of these activities are related, resulting in active communication between students and teachers. Based on these descriptions, a teacher must have a didactic capabilities: the ability of a teacher to think of creating a situation in the learning process. The thought process of teachers in the context of learning occurs in three phases: before the learning, during the learning takes place, and after learning (Brousseau, 2002).

Based on early studies in one high school in Bandung, the learning process is not the expectations of the curriculum of 2013. The learning process is centered on teachers, students only receive information from teachers. Apart from that most of the high school students have difficulty in understanding the concepts of chemistry. It became one of the factors that makes the results less than the maximum evaluation of student learning, test scores of students on the topic of comparative law remains in one high school in the city there are 23 students who scored less than KKM and the average score was 63.2. This is consistent with research Krisnawati et al (2013), entitled Digging Concept Training Students Madrasah AliyahAbout Stoichiometry by Using Two-Tier Diagnostic Instruments test, with the results of the average student's understanding on the concept of stoichiometry 37.56% which is low and to the topic Proust law is also only 19.80%.

Therefore, teachers should make learning design that minimizes the students' learning difficulties. The diversity of student response requires teachers to prepare the solution. the solution is action didactic and pedagogical actions that are equipped with the prediction of the response of students and teachers solutions. According to Suryadi (2010), learning design is equipped with a predicted response of students and teachers is the design didactic solutions.

- How is the characteristics of learning obstacle which could be identified related to the topic of law of definite proportions?
- How is the design of collaborative learning sharing task and jumping tasks in the topic of law of definite proportions?

2. METHODOLOGY

This research employs descriptive qualitative method Erickson in Sugiyono (2013) stating that the characteristics of qualitative research are as below: Intensive, long-term participation in a field setting, Careful recording of what happens in the setting by writing field notes and interview notes by collecting other kinds of documentary evidence, Analytic reflection on the documentary records Obtained in the field, Reporting the result by means of detailed descriptions, direct quotes from interviews, and interpretative commentar.

Participants in this study are the first respondent is the students who have studied law of definite proportions topic. They are students of class XI of the 2015/2016 academic year. And the second respondent is the students who will be taught the topic of law of definite proportions with collaborative learning sharing task and jumping task at grade X the of the academic year 2015/2016. The research subject taken only two classes because the design of the learning is done two cycles of learning to know the response characteristics of students through lesson analysis were used to analyze the learning. Chemistry teacher who becomes the model teacher is a teacher who will be teaching in the classroom that have been defined as a class of research subjects, and teachers who collaborated with researchers as team teaching.
The instrument of this research are the instrument test and non-test instrument. The test instrument in this research is referred to as Tes Kemampuan Responden (TKR). TKR is performed three times. TKR was given to students in grade XI IPA who has been studying the topic of law of definite proportions. This test is to identify learning obstacle to learning experienced by students when studying the law of definite proportions. Second TKR given to students of class X IPA-1 after the first implementation learning design based analysis of the students’s learning obstacles. Third TKR is given to students of class X IPA-2 after the implementation of the lesson plan based on a revised draft first lesson. And non-test instrument are, the observation sheet, interview guides, lesson analysis sheets, and documentation.

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<th>No.</th>
<th>Amount of students (n = 24)</th>
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<td>Scor 0</td>
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<tr>
<td>1</td>
<td>4,20%</td>
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<td>2</td>
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<td>3</td>
<td>12,50%</td>
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<td>4</td>
<td>54,20%</td>
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<td>5</td>
<td>70,80%</td>
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3. RESULTS AND DISCUSSIONS

Students' learning difficulties in the law of definite proportion can we get from identify result of (TKR) and results of interviews conducted to students who have learned law of definite proportion. And also supported by the results of interviews with the chemistry teacher. TKR be a matter of description, amounting to 5 (five) questions prepared by grating questions in Table 1

<table>
<thead>
<tr>
<th>Table 1 TKR's Indicators Questions of Law of Definite Proportions</th>
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TKR results obtained from 24 students of class XI IPA who has been studying the material law of definite proportions. The following is a discussion of the difficulties experienced by students based on the identification of TKR answers.

Problem number 1: This problem relates to the ability of students to determine the elemental composition of the compound. Problem number 1 consists of two questions. The expected answer that students can determine how to determine the composition of elements present in the compound and can see the magnitude of the mass percent of iron and oxygen in the iron perkaratan. In this matter there are still many students who are wrong in doing. Distribution of student score data acquisition can be seen in table 2 Table illustrates the distribution of students' ability to solve problems to determine the elemental composition of the compound. Percentage obtained is used to determine how much student learning obstacles in resolving the matter. Based on the responses of the students obtained the following data:

From table 2 we can find the percentage to question number 1 is 66.7% with the acquisition of a score of 5, which means that more than half of the students have not been able to resolve the matter appropriately. Most of these students could only answer the way in order to determine the elemental composition but could not complete the calculation of the mathematical and there are some students who
can not distinguish between elements and compounds so that in the search for elemental composition into confusion. This are the obstacles students to solve the number one appropriately.

The largest percentage in question 2 is a score of 20 with a percentage of 41.7, followed by students who received a score of 5, 0 and 15. The data shows most of the students are able to calculate the comparison properly. Errors students in general are not able to look for the right divider so that it becomes the simplest comparison, so they are a hindrance in achieving the goals of students in the topic of law of definite proportions.

According to the table 2 it is clear that most students still can not do about the third well, the largest percentage are students who score 5. This is because the students still can not seek denominator in order to obtain a comparison of the simplest and yet understand the law of definite proportions sehingga experiencing barriers when ordered to make conclusions based on the calculation of the comparison questions.

The fourth matter is used to determine extent of students' abilities to solve problems as well as the application to determine whether or not the student is still confusion in calculating perbandingan. Pada Table 2 shows that the majority of students still can not analyze well proven with the greatest percentage of students who are a score of 0 is as much as 54.2%. Although it was followed by students who received a score of 10. It is stated that is the students are still not able to analyze problems and identify reasons why, indirectly visible students simply memorize the law of definite proportions.

Last TKR matter is still associated with the application of jukum comparison anyway, knowing his purpose analysis capabilities in solving the existing problems are more applicable. On the last question is intended to determine students' analytical power in determining the elemental mass to form a compound, a compound formed masses and masses of residual reactant. Based on table 2 looks most students who can not work on this matter with the largest score is the percentage of students who received a score of 0.

Interviews were conducted to students grade XI after melakasanakan test the ability of respondents (TKR) with the aim of confirming the answers TKR students. Interviews showed that students do not understand the law of definite proportions, most of them just memorized the only law of definite proportions so as to solve problems they encountered resistance. Here are the results of interviews with students.

Researcher : Gimana bisa ga tadi? Ini yang ditanya nya apa sih?
Student : Calculating the ratio of hydrogen and oxygen.
Researcher : How to calculate it?
Student : Emm? forgot it mom. Eh, fold or divide maybe
Researcher : Oh okay, you already finish answer for problem of law of definite proportion, what is law of definite proportion who you know.
Student : Emm it is…? It’s element fix. Ahh, I’m confuse.
Researcher : Can you imagine step to solve this problem?
Student : No… I can’t. I reaaly confuse to solve this problem. It only know mass of O₂ but the problem we must find mass of CO₂
the concept is in accordance with the limits of high school students so until researchers and teachers can construct a new design. Here's Lesson Design, which will be used in the implementation.

Lesson design consists of three phases, the first initial activity, the core activities and the closing, in which there are task-sharing activities and jumping task. At the beginning of the activities of teachers show props depicting molecular form of the compound H\textsubscript{2}O and HCl, then students are asked to pay attention to both forms of the molecule and ask what similarities and differences of the two compounds. Prediction student response is that students can mention some similarities and its differences, namely 1) of its constituent elements but there are two and both its existing H, 2) different shape but, 3) Number of different atoms, 5) Student did not answer. Anticipation of his teachers lead students so that students see the similarities and differences that exist. Then the teacher asked how the mass ratio of the constituent elements of the two compounds. Prediction student answers as follows 1) H\textsubscript{2}O 2: 1, its HCl 1: 1 2) H\textsubscript{2}O 2: 8, 1:35 his HCl 3) H\textsubscript{2}O 1: 8, 1:35 his HCl. The anticipation teacher gives instructions compared but its not the number of atomic mass of each of these elements. After confirming that the teacher answers students and teachers returned to ask based on the comparison of H and O previously obtained are 1: 8 what if the ratio of H and O obtained from experimental data, is still the same 1: 8 or not? And the teacher asked conclusions can be drawn based on the experimental data. Predict student answers are 1) the student answered ratio obtained remains the same even though its mass is different only when there is no residual mass of one element of excess, his conclusions all kinds of water has a mass ratio of the same element. 2) student confusion in answering because no residual mass. Anticipation that teachers do is to guide students to use leading questions on the answer should be.

Core activity is the main activity in learning which aims to develop the concept of the student and the student experience. At this stage the students were given the task in the form of Student Worksheet (LKS) is done through group discussion. At the core of this activity students make sharing with friends of his in doing LKS consists of 5 questions.

For about the first aims to determine students' ability to seek mass ratio of each element in a compound. In question number one student is given the task to calculate the comparison element on each compound with the goal of students experiencing the situation directly to obtain information about the law of definite proportions. After students answer questions about the number one followed by number two and number three on the form about an applicative so that students can better understand the sound by applying the law of definite proportions in terms of a more diversified.

The activities cover the activities of "jumping". Activities that occur at this stage students are given a problem that exceeds the level of distress in the form of a text book about contextual applications. Problems that give the students predict whether the law of definite proportions apply to the phenomenon of water. Based lesson design that has been designed together with the teacher, it can be concluded that there are four tasks that gave the student that is, students observe a demonstration of
differences in molecular shape and incorporate find a comparison of elements in the compound. After that predicts the ratio of elements in a compound derived from a different mass and next to train students in the understanding of the law of definite proportions of students discussing and doing exercises on worksheets that have been provided that the activity of “sharing”. The final task is working on about “jumping” to predict whether comparative law still apply in some water phenomenon.

Implementation lesson plan by using sharing task and jumping task on the topic of law of definite proportions went well overall. In class X IPA 1 when the initial activity students were enthusiastic because there molymod. At its core activities, discussions are going well. Students discuss the matter of LKS with the material according to the text book level. Some students at the time of the initial observation does not focus on learning to look more focus on learning and get involved in discussions. At the end of the activities the students are given a stimulus to display some of the phenomena of water and asked whether the phenomenon of the water or not in accordance with the law of definite proportions ?. In this activity students were more enthusiastic to find answers to these problems. In the first implementation of this activity and jumping sharing his run well. There are some students who are jumping on the cover of this activity, the results of TKR he got away from her usual value. In the implementation of class X IPA 2 all the activities going on well. Even the discussions that took place when activity looks more optimal sharing of class X IPA 1. Discussions that occur not only among students but also daam groups occurred between students of different age groups. Activity sharing and jumping on two classes is achieved well.

4. CONCLUSION

Based on the findings and discussion of the obtained several conclusions related to the research questions posed as bellow:

learning obstacle are identified experienced by students in the topic of comparative law, as bellows: the students have not been able to calculate the composition of the mass of the elements of compound, students still confuse elements and compounds, the students have not been able to determine the numbers so the divider to get a comparison of the simplest, students only memorize law of definite proportions, not understand it, the students do not yet understand about the applicable calculation of the equation.

Didactic sesign on the topic of law of definite proportions can minimize the constraints faced by students. Lesson plan on law of definite proportions is compiled based Learning Obstacle (LO) were identified at the beginning of the instrument test, the learning device used as rpp, books, syllabus and the learning process itself and reinforced from the repersonalisasi of books source. The draft study presented in chapter form design and lesson design that has been adapted to the characteristics of high school students Lab. School UPI science class.

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6. REFERENCES


Hendayana, S. (2013). Developing tools for analyzing of classroom interaction: Does it student-centered or teacher-centered lesson. Bandung: PPT Seminar internasional MSCEIS. UPI.
Kuno. (2012). Impact of lesson study sharing the values of high quality lesson. WALS International Conference, Singapura.


