THE IMPLEMENTATION OF SOCIOMETRY IN GUIDED DISCOVERY LEARNING METHOD OF GRADE 8 STUDENTS IN SMPN 1 LAWANG, INDONESIA

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Abstract: The low of student group activity and thinking skill in mathematic problem solving make mathematic learning less ideal. Sosiometry in guided discovery learning method (GDL) can be used as solution of this problem. The aim of this research is to describe the implementation of sosiometry in GDL and problem solving skills in geometry flat side as a subject. Based on the purpose and participant indentification descriptive-quantitatif was the type of this research. Teacher and students activity data, sociogram and students problem solving skill were collected from observation, questionare and test.

Keywords: Sociometry, Guided Discovery Learning Method, teacher activity, students activity and student problem solving skill.

I. INTRODUCTION

Difficulty of determining the impact of each learning component makes difficulty in improving the quality of learning. Teacher is one of component which greatly affected learning process. Teacher as facilitator was required to has a communication and interaction skills so that students can understand the topic efectivelly (Sanjaya, 2007). Those skills can be implemented in class learning process to ensure the ideal learning has gain so that learning setting can be achieved.

Students learning activity is the important part in a classroom learning. The students activityemphasis create more meaningful learning process. When students think that the lesson is important and can transfer the knowledge they have already learnt so the learning become meaningful learning (Nasution, 2008). Evidence shows that applying student-centered approaches are more effective than teacher-centered for improving learning skills, the problem solving, decision making, critical thinking, creative thinking and interpersonal relationship (Oztruck, 2008).

The explanation above show an accentuate to student center learning process, students posited as subject of learning who can explore in learning experience and teacher act as a facilitator. However, teacher center leaning has not developed exploratory's skill using their own experience and make students can not generate fact and take decision so that students face difficulties in understanding the concept.
Teacher center learning process generate direct instruction, that is when materials is given by speech and students have to understanding the materials by listening pasively (Rusman, 2013). Those instructional cause students less understand the point of materials and hard to achieve the instrustional's goal.Baesd on the explanation, direct instruction has not maximized student's achievement.
Akanmu (2013) on his study revealed that students in Nigeria has low perfomance at both internal and external examination. Further, he described that students' low performance were affected by three broad areas: teaching problems (67%), negative attitudes of students towards the subjects (42%), and examinatiom difficulty (21%).

The fact during class observation whichwasconducted at February 13th 2015 showed that teacher used a direct instruction as their learning method. The class instruction was begun by a good interaction between teacher and students. However, this situation could not sustain until the class end. There were eight in 28 students who learned and did their task actively and more than half students had difficulty in mathematics problem solving in task or quiz.

Based on teacher interview at February 13th 3015, they transferred the learning materials through direct instruction. Meanwhile, teacher selected the member of group by random sampling method which was inappropriate method to make student group discussion so that students worked inactively and gave significant impact in students problem solving skill. The result yielded that two student was categorized as isolated student and one studetnt categorized as rejected student. In addition, non-heterogeneity students in a group emerged improper knowledge transfer for each students so that they needed more time in learning process.

Those situations would be different if teacher can implement variations of learning method which can stimulate students thinking in problem solving and enhance students learning activities. Based on the explanation, learning approach is needed to make mathematics learning process became ideal so that

students activity and problem solving in learning process can gain any enhancement. The establishment of learning approach has to make students transfer their knowledge properly and independent. Guided discovery learning as one of learning process method and sociometry can be use as solution from the problem above.

GDL is a guiding learning group using programmed booklet study which contains series of questions and answers that are arranged gradually to problem solving (Hamalik, 2013). Mcdonald (2011) yieled GDL as suitable strategy for the improvement of interpersonal partnership, team working, transfer of knowledge, ariving at a consencus, application of interactive process and creating collaborative atmosphere among students, constant communication, active listening skills, social communication and emphaty.GDL method has five learning steps, (1) formulated the problem, (2) processing the data, (3) arranged the conjecture, (4) conclusion and (5) exercise (Markaban, 2006).

The result of LestariW. I (2012) research, concluded a significant difference between students learning outcome using GDL with direct instruction in student grade 8-A SMP Nigeria 1 Tanjinan. In addition, students have better understanding in alternative answer that were mathematically correct. Mandasari, R. G (2014) yielded that students problem solving, learning achievement and creativity increased significantly. However, the previous study revealed the weakness of GDL such as incompatibility the group election and improper class environment. The alternative solution to cover up GDL's problem is sociometry. Trough sociometry, reseracher can see students statues and social acceptance in their class.
Sociometry is defined by measure the “socius” – the interpersonal connection between two people (Moreno, 1951). Moreno (Kurzman, 2007) conceived two condotions beyond eliciting choices and depictingsociometry: (1) the choice must be implemented and (2) the reason for schoosing must be made over and explored. Further, Ingridwati (2007) explained that sociometry can be done by giving a questionnaire to students, then assign a filtration the questionnaire. The next step, described the flow of students choice in the form of a diagram so that the relationship can be seen. The diagram can be made by lane, circle or free from. The drawing path begins with the student having the largest selection frequency as the ordinate axis and place each individual as the selector frequency obtained using the line. The lines are interconnected and form a diagram called the sociogram.

Based on Jones study (2006), sociometry can emerge positive relation in a group so that group member can be more open, and make group discussion more effective in time management and practical. It simplifies that sociometry is a drug for GDL weakness.The set of the combination of GDL methods and sociometry is to construct students activity and create a well knowledge delivery in each students during the discussion in mathematics learning. Despite to construct students activity and well delivery knowledge, the combination of this method and technique is to see students problem solving skill.

II. METHODOLOGY

2.1. Materials and Procedures

This qualitative-descriptive study sought to represent students activity and problem solving skill, also describe the implementation of mathematics learning process using combination of GDL learning method and sociometry of grade 8-D students of SMPN 1 Lawang. The respondents was selected randomly using random sampling method and gained 28 students grade 8-D students of SMPN 1 Lawang. Data each respondent was collected from observation and test.

2.2. Sociogram

Firstly, each respondent has to fill the sociometry questionare. The questionare will ask about friends who they like and dislike to study in a group and the cleverest student they might think. Filtering and drawing the questionare is the second step. When researcher have drawn the questionare, sociogram is obtained. Using sociogram, researcher will know student position in social relation and be able to determine a partner for each student.

2.3 Teacher and Student Activity

Observation in teacher and students activity are used to discover wheter the implementation of GDL learning method and sociometry in mathematics learning process is going well or not. To measure students activity and problem solving skill, researcher use record scores on a scale from observations. Students activity in this research based on Permendikbud No. 81 A which include observe, ask, collect, associate and communicate. Researcher will observe students activity during the learning process. Meanwhile, teacher activity is observed based on RPP (lesson plan) for three days.

2.4 Students Problem Solving

Students problem solving skill in this research based on Polya’s problem solving techniques, such as understand the problem, devise a plan, carry out the plan and look back. Mathematics problems given to students are non-routin problem. Two kind of students problem solving which researcher measure in this study, group and indivduals problem solving. Researcher assess group problem solving in four days observations and indivuals problem solving trough post-test after the subject is given.

III. RESULTS AND DISCUSSION

3.1. The Implementation of Sociometry in GDL Method

The study about observation during the research in grade 8 SMPN 1 Lawang is begun by implementation sociometry in GDL mathematics learning process. Sociometry generate a sociogram from questioners relate to a specific criterion. The sociogram yielded two isolated students and a rejected student. Furthermore, the criterion implementation of sociogram can produce a heterogeneousgroup and create a well study atmosphere.

For the first day observation, mathematics teacher and collega appointed as two observer who keep trak of students and teacher activity. Based on the first day observer records, teacher can employ every stage of lesson plan well so that students can involve in learning process even if students did not used with the method. Several constrains teacher faced in learning process were uneffective time management and students self disbelif. This situation made teacher had to give motivation to students as solution so that students gave any responses willingly.

In the second day, teacher had difficulties with students less attention in learning process which was caused by the sociometry group formation that referred on students friendship and suitability. The condition made students talk too much and need more time to accomplish the learning process. Solution which could be offer in this class was teacher should insist students to respect the teacher and rule they had made.Teacher ability on the sociometry implementation in GDL learning process for the third day had increased. However, students did not accustomed to presentation study so that they were busy joking with their friends. Fortunately, teacher could take control of the class and give guidance so that students become more reposeful and show enthusiasm in presentation learning process. This response gave a good impact on students communicate and interaction in each student.

As is observed on day one to three, the success of sociometry implementation on GDL learning method presented on teacher and students activity which had gradual increased in every meeting. Genarlly speaking, the percentage of teacher activity in each part had different portin for each day. The initial activity increased gradually for three days ebservation, acounted for 100% to 91.6%. Meanwhile, the core and end activity had a ceiling trend during the given period. Core activity increased for over 0.1 on the second day, and had steady percentage on the third day. The end activity had remainded constant score on day one and two, approximately 93.7%, and growth to 100% on finishing day.

Five component assessing students activity, observation, asking, collecting information, associating, comunicate. In general, every aspect of students activity had an upward trend during three days observation. Observation incline gradually troughout the observation, accounted for over 0.7. Associating and collecting information had similar rate on day one to two, at between 40% and 60% per meeting. Simillary, asking and communicating had increased steadly during observation on the first and second day, nearly three in ten. Meanwhile, asking, collect information, associating and comunication rocketed dramatically and reached a peak on the third day, accounted over a half increment.

3.2. Students Problem Solving Skills

Group problem solving skill was seen from group assignment or discussion from the first to thrid meeting. Genarally speaking, every component of students problem solving had inclined tendency during the period. “Looking back” which hit the lowest score during the study increased gradually, around one in twenty for each meeting. “Carry out the plan” achieved over 6% higher percentage from the first day to the third day meeting. Meanwhile, “devise a plan” and “understand the problem” increased gradually and had fairly similar rate at each day observation, around three-quarters to 95%.

The given post-test aimed to assess students problem solving individually. Overall, “understand the problem” hit the highest rate compare to other aspect of polya’s problem solving, over nine in ten. Meanwhile “devise a plan” and “carry out the plan” had incline by over 10% from “understand the problem”. Interestingly, “look back” had the far less percentage amongs other, acounted for less than two-thirds.

CONCLUSIONS

As is discussed in the previous section, the porpotion of teacher activity inclined gently during observation. The percentage gain around 0.9 on the first day, and the rate climbed over 3% for the next day observation. Ont the finishing day of observation, the score rose marginally and gain almost 96%. Since teacher could employ the leasson study well and hit high percentage for overall teacher activity, nearly 95%. The score included in very good category which meant teacher can implement sociometry in GDL learning method well.

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The students group problem solving skill showed upward tendency in the given period of observation. The first to second day observation emerged similarity on the percentage, around 70%. The score was gained over 10% increment on the finishing day. Those score illustrated increasing level from enough category to good category. Meanwhile, understanding the problem, devise a plan, carry out the plan for student individual problem solving skills include in good category, accounted for 91%, 83% and 80% respectively. Incontrast, "looking back" had the lowest rate among other, and the percentage was nearly six in ten. In common, students individual problem solving represent higher score than group problem solving score.

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