

The Application of Discovery Method and Expository Method on the Powers of Number towards the Result of Student Learning in the Grade IX Junior High School of Perintis 1 Sepatan Tangerang

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Abstract—Main reason of the low-quality education in Indonesia is caused by the application of learning method which has been trapped with the traditional mindset for ages. The fact, the traditional learning method cannot be implemented for all students because every student has their own uniqueness in power, need, and interest for studying. Therefore, the implementation of Discovery Method and Expository Method is expected that can effectively fulfill the student need and encourage student to be more motivated, participated and involved in learning process. This research aims to give better result on math learning. The used sampling is Cluster Random Sampling. Based on the calculation is obtained data that the average of student learning result through Discovery Method has mean 83.07, standard deviation 7.24, median 82.63 and modus 82.00. Further, the average of student learning result through Expository Method has mean 74.32, standard deviation 7.13, median 74.50 and modus 81.00. Based on t-test is obtained the value of $t_{count} = 4.56 > t_{table} = 2.0063$. Therefore, it is concluded that H_1 is accepted and H_0 is rejected. The conclusion of this research is that there is a difference in student math learning result on the powers of number taught using Discovery Method and Expository Method in the grade IX Junior High School of Perintis 1 Sepatan Tangerang.

Keywords—*discovery; expository; student learning result*

I. INTRODUCTION

The advancement of education in a nation really determines the quality of the nation. Therefore, every nation realizes that the advancement of education realm must get special management. Based on survey in 2014 by *United Nations Educational, Scientific and Cultural Organization (UNESCO)* toward the education quality in developing countries in Asia Pacific, Indonesia was in the 10th from 14 countries. This condition is a challenge for education realm in Indonesia to be more creative and innovative in creating excellent and competitive education system in accordance with the current development.

Education is a throughout life need. Every human requires education whenever and wherever he is. Education has vital meaning that without education human hardly grows and even

falls behind. In consequence, education must be carefully directed for developing a competitive and qualified human who also has noble character and good morale.

Education functions to develop ability, form character and develop potency in order to make a man who is faithful and pious to the Almighty God, noble, healthy, knowledgeable, creative, independent, and responsible.

To fulfill those education goals, consequently it is held a series of educations in purposeful, planned, directed, gradual and systematic through formal education institution such as school. In education institution (school) provides several subjects offered to student to be mastered in which one of these subjects is math. By teaching math, student is expected to have reasoning ability reflected through ability of critical thinking, systematical, logic, and creative, honesty, objective and communicative. Therefore, student can notice the progress of the time and can adapt with life provision which is more challenging due to the development of science.

Math as a branch of science has vital role in human life. Math is introduced to student since early childhood education to higher education because math is a basic for learning another science. However, there is an opinion that math is a tricky subject. To get rid of that assumption, teacher has to give more information and delivers math in accordance with the ability of student. Besides, learning method must be adjusted with the situation and condition. In teaching, teacher must expect that the taught knowledge and skill can be accepted, remembered, and developed by student.

The use of method in learning process has crucial role because without the exact method will affect the success of process and the result of that learning process. Besides, there is possibility that the utilization of existing infrastructure such as library's book and other facility can affect learning process because infrastructure and facility relate with the used method in learning process.

For that purpose, it is required a way or method of learning math which relates with situation and condition and can be accepted by student for understanding math.

II. LITERATURE REVIEW

A. Study and Study Result

Study is a process which causes the behavior change affected by reaction on certain situation or internal process occurring within someone [1]. Someone can be said study if there is a process causing a behavior change. The change can be occurred with effort so from cannot do something to be able doing something. Activity and effort to change behavior are a learning process while the behavior change itself is the result of studying. Study result is not a mastering the result practice however it changes the behavior [2]. Someone who achieves the study result will change his behavior both knowledge and manner. Study result is ability had by students after they acquire their learning experience [3]. In learning interaction, there is a direct contact for encouraging the students' ability. Study result is a result from an interaction of both studying and teaching [4]. Someone can be said achieving the result study through learning process if there is interaction between studying and teaching or between student and teacher.

Study is a teacher action during learning range relating with the decision making about the competency attainment of learners who has a unique individual characteristic [5]. Result study can be achieved after learning for measuring a change happened on student which is showed by learning performance.

Study result in essence is behavior change [3]. Behavior is the outcome of learning which in a broad sense includes sector of cognitive, affective, and psychomotor.

Based on theoretical review above, therefore, writers conclude that study is a process acquiring a new information in which individual does not remember but does a constructing process of knowledge through experience. That experience has been achieved before and it is also caused by interaction between individual with his environment (home, school, teacher, peers, and the others). While result study is an achieved result in learning process by bringing a good change in domain of cognitive, affective and psychomotor. Result study in this research just focus on the development of student cognitive.

B. Discovery Method

Learning method is a way to simplify in understanding the material delivered by teacher in learning process. The selection of the exact learning can affect the condition of learning process in a class. Discovery method is a way to deliver a subject which encourages a training participant for obtaining the answer of a faced problem [6]. In their learning process, the participants can do the effective and efficient learning process if they do an activity within learning process.

Discovery method is a mental process in which student can assimilate a concept or principle [7]. Hence, discovery is an initial mental process of student such as absorbing, digesting, explaining and making a conclusion in order to be capable to solve a learning concept.

Discovery learning method is a teaching method for managing the learning process with the result that kid acquires a knowledge that he has not known before [5]. The method

encourages student for actively study by himself to find a solution of certain problem.

Kid must have an active role for finding out problem solving and the attached knowledge, for example a knowledge which is meaningful for student [8]. Discovery learning is a student who is encouraged to study by themselves [1]. Student actively studies with concepts and principles, and teacher encourages student to have experiences and connects the experiences with principles for themselves.

Steps of discovery learning; (1) identifying student's need; (2) selecting the preface towards the concept which will be learned; (3) selecting the material or problem which will be learned; (4) helping and clarifying material or problem which will be faced by student and choosing the role which will be played by every student; (5) checking the learner's understanding on the problem which will be examined and chosen; (6) preparing the class and the needed tools; (7) giving chance for learner to have investigation or invention; (8) helping student with information or data if it is needed by student; (9) leading self-analysis with question which drive and identify the problem; (10) encouraging interaction among students; (11) giving brace for student to be energetic for inventing.

In learning process of discovery method, teacher acts just as mentor and facilitator for directing student to find concept, argumentation, procedure, algorithm and the others. The reasons about the use of discover method in learning process including; (1) developing active learning for student; (2) finding and examining the concept by themselves which will be learned, therefore, the achieved result will be much longer in student's memory and cannot be easily forgotten; (3) the meaning found by student is a meaning which will be mastered and easily used for another situation; (4) students think, analyze, and try to solve problem which they face by themselves in which this habit will be used for real life.

The use of discovery technique tries to improve student activity in learning process. This technique has advantages including; (1) this technique can help student to improve, increase readiness and the skill mastery in cognitive process or student introductory; (2) student achieves individual knowledge which can be sturdy and deep inside student's soul; (3) this technique can give a chance for student to improve and advance matching with their own capability; (4) it can drive the way student learn in consequence student has more motivation to study harder; (5) helping student to strengthen and increase his confidence through his invention process; (6) this strategy focuses on the student not on the teacher. The teacher just a study peer who helps when it is needed.

Discovery technique has weaknesses which must be consider, including; (1) on student, there are must be readiness and mental maturity for this kind of study. Student must have desire to know well his environment; (2) if class is too big, this technique will be less successful; (3) both teacher and student who already adapt with traditional planning and learning perhaps will be disappointed if it is changed with this discovery technique; (4) there is opinion that this mental process really considers only in understanding process. It does not consider the forming progress of student's manner and skill.

C. Expository Method

Learning method is used by giving earlier explanation of definition, principle of subject concept and exercise example for problem solving in form of lecture, demonstration, question and answer as well as assignment [5]. Teacher does not speak all the time however he just speaks on the beginning of learning, explains material, and asks question example in the required time. Students do not only hear and make a note, but also practice and ask if they do not understand.

Expository model is a teaching activity focusing on the teacher [4]. The learning emphasizes on process of delivering material verbally from teacher to student. Expository Model in essence is deliver knowledge to student [9]. Active teacher presents explanation or detail information about subject which will be delivered to student in purpose to transfer knowledge, skill, and values to student.

Strategy of expository learning is a learning strategy emphasizing on process of material delivering from teacher to a group of students in order to make them optimally mastering a subject [10]. Teacher delivers subject structurally which is expected that the subject can be well understood by student.

Expository teaching is a plan of systematic learning on meaningful information [1]. Information is given by teacher to student for solving the problem faced by students, so students can think and solve the faced problem. This is the step for students after they heed teacher explanation. Through this step, teacher can gather information about students' understanding and their grip on the subject. This technique can be done including: (a) by making an assignment which is relevant with material which has been delivered; (b) giving a test relating with subject which has been delivered.

From stage and steps in learning activity of expository method above, therefore, researchers use steps as follows: (1) teacher motivates students to develop spirit for studying; (2) teacher chooses the learning goal; (3) teacher identifies and understands student's characteristic; (4) teacher composes learning material and related material; (5) teacher delivers material by giving brief information on the board, gives a concrete example and feedback, gives summary in the end of every explanation; (6) teacher plans a programed evaluation by giving exercise.

In the implementation of this expository learning method, teacher attempts to improve student activity in learning process. Therefore, this expository method has advantages as follows: (1) by expository method, teacher can control the subject order and extent, therefore teacher can control how far student mastering a delivered subject; (2) this learning method is considered very effective if subject which must be mastered is comprehensive but the time for studying is limited; (3) through this strategy, student can listen through narrative (lecture) about a subject as well as student can see or observe through demonstration performance; (4) another advantage, it can be used for considerable student and in the bigger class.

This expository learning strategy has weaknesses which must be aware including; (1) this learning strategy is only done on students who have a well ability on listening and paying attention. For students who do not have these abilities, it must

be used another strategy; (2) this strategy is impossible to tackle every individual difference such as ability, knowledge, interest and talent as well as learning style; (3) this strategy is more delivered through lecture. It is hardly to improve student capability in socializing, interpersonal relation, and critical thinking; (4) the success of expository learning strategy really depends on what teacher has such as preparation, knowledge, confidence, spirit, enthusiasm, motivation and another capability such as ability of communication and handling the class. Without all of those, it can be confirmed that learning process is fail; (5) due to communication style, this learning strategy mostly is one-way communication. Hence, the chance to control the student understanding on the subject is limited. Besides, one-way communication affects the knowledge owned by student is limited on what teacher gives.

III. RESEARCH METHOD

In this research, writers use Quasi Experimental Design as a research method which the design is the development of True Experimental Design. This design has control group but it does not fully function to control external variables to influence the experiment practice.

The approach of experiment method is a part of quantitative descriptive research because this study is aimed to measure the influence of two variables on another variable. This study is to know the difference of Discovery Method and Expository Method implementation. Hence, this research measures the difference of free variable which in discovery method and expository method is attached variable. The attached variable is the result study of math.

IV. RESEARCH RESULT AND EXPLANATION

Based on the calculation, it is obtained the mean of student study result in the class taught with discovery method is 83.07 with standard deviation 7.24. In the class taught by expository method has mean 74.32 with standard deviation 7.13. Both those classes are in normal distribution, it can be seen in the result of testing which shows that $L_{count} < L_{table}$ (0.1209 and $0.1577 < 0.1674$).

While the result of hypothesis testing using t-test on the grade of significant $\alpha = 5\%$ is obtained that the result $t_{count} = 4.56$ and $t_{table} = 2.0063$ means $t_{count} > t_{table}$. From that result it can be concluded that H_0 is rejected. It means there is a significant difference on study result of math between students who are taught by discovery method and expository method ($t_{count} = 4.56 > t_{table} = 2.0063$). This difference can be seen from the student study result on discovery class obtaining the mean value is higher on deviation 8.75 compared the expository class. In the discovery class, the highest score is 97 and the lowest 70. In the expository class, the highest score is 87 and the lowest is 60. It can be concluded that the difference of student's study result from these two classes is the effect of treatment. From calculation, the class average taught by discovery method is higher than the class average taught by expository method.

Based on the observation, learning process with discovery method and expository method is a new experience for students

in learning math. For student, learning using discovery method is more directed and guided to find and understand according to teacher's instruction. Whilst in the learning using expository method, students just only listen and ask the teacher explanation. In this case, there is difference of student's thinking ability in learning.

Discovery method and expository method have their own advantages. In general, the overall use of these methods is complemented each other however there are several references and analysis results stating discovery method is better than expository method. In this research, this premise could be true but there is one thing that must be considered that learning process in Junior High School as in this research sample has difference and unique characteristic. That different and unique characteristic can be identified by pattern and style of student learning which positions teacher is not only facilitator in learning, so it is frequently found that teacher has high domination in learning process. This characteristic clearly gives another color in this research stating general theory saying that discovery method is better than expository method is not applicable.

Based on that condition, it can be said learning using discovery method is easier digested by student because the learning style is easy to be understood and comprehended comparing with the learning using expository method. It has been proven based on the statistic calculation which has been done, and it has also been proved that there is difference between math result between students taught by discovery method and expository method.

V. CONCLUSION AND SUGGESTION

A. Conclusion

Based on the research which has been done it is concluded that learning supported by student's basic ability will give maximal result. Student's math result taught by discovery method has better result compared to the student's math result taught by expository method. It is found on the mean value of discovery class which is 83.07 while the mean value of expository class is 74.32 which has deviation 8.75. There is

significant difference between the student's result on math taught by discovery method and expository method ($t_{count} = 4.56 > t_{table} = 2.0063$).

Using discovery method, the material delivered by teacher will guide students, so students can find and understand the powers of number material based on their understanding and ability. Whilst expository method focuses on the active role of teacher in delivering subject. If students do not use their ability to think, they cannot understand even pay attention, listen and ask. Students only learn what teacher delivers to them.

B. Suggestion

Based on the conclusion of this research, it is suggested that teacher can explain discovery method as teaching alternative method on the powers of number subject. Teacher shall observe class management while learning process occurs. When teacher explains, all student concentrate to listen and pay attention. Discovery method will be more effective if it is applicate in small class. Teacher shall make a learning model using discovery method and expository method in a brief way and it must be easily understood by students.

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