



The Influence of Brainstorming Learning Methods on Mathematics Learning Motivation in Class X Students of SMK Koperasi Pontianak

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Abstract

The purpose of this study was to determine the effect of the brainstorming learning model on the mathematics learning motivation of class X students at the Pontianak Cooperative Vocational School in the year 2022-2023. The population in this study were all students of Class X SMK Cooperative Pontianak in the academic year 2022-2023, with a total population of 65 students, and the researchers randomly selected the population for research. This type of research was conducted using quasi-experiments with pretest-posttest group design. The study sample was selected using simple random sampling. The instruments used are learning motivation questionnaires and observation sheets, providing recitation and brainstorming methods. Therefore, Class X AKL was chosen as the control class with 17 students, Class X BDP was chosen as the experimental class with 19 students, and 36 students were used. Data was collected using a questionnaire method in the form of an explanation, but the analysis of the data used quantitative explanations, hypothesis testing used the T-test formula. The average score of research results obtained from the questionnaire of students' mathematics learning motivation in the control class was 71.8, and in the experimental class was 82.3. This shows that the condition of both samples of both the control class and the experimental class originated from the same state. As for after being given treatment, the experimental average became 84.2, and in the control class it became 73.2.

Keywords: Brainstorming Learning Model, Learning Motivation

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INTRODUCTION

Learning is a change in behavior in individuals and their environment (Suardi, 2018). Human beings are learned beings, and modern thinking, agility, intelligence, and wisdom are acquired through the processes of reading, seeing, listening, and imitating. According to Sudjana (Rusman, 2014) learning can be viewed as a process directed to the goal and the process of acting through various experiences, learning is also a process of seeing, observing, and understanding something. Learning events can occur when humans are able to process stimuli and respond well and not in pieces so that they can really understand them. It can be concluded that the essence of learning is a form of behavior change that involves various aspects, both physical and psychic, which is relatively settled after he gets practice questions or experience in learning activities.

Setting educational process standards is a strategic policy that is very important for equitable distribution and improvement of education quality through a standardized education process. Each teacher or school administrator can decide how the learning process should take place. Therefore, the learning process is a process that improves the

quality of education. The realization of standards can be started with an analysis of each component that can form and influence learning processes (Vienna, 2016: 13).

Learning motivation has a huge influence on the success of the learning process. One of the causes of students having learning difficulties is low learning motivation (Wahyuni & Leonard, 2021). As explained in (Rifa, 2011: 97) "Low-motivated learners, for example, will experience difficulties in learning preparation and in the learning process". Some experts reveal that the factor that affects low learning motivation is the internal factor of the student. According to Syah, (2016: 182) the low motivation of students learning which is the cause of learning difficulties is reflected in internal factors of students, namely internal factors that are affective such as emotional and attitudinal stability of students. This is also influenced by the environment where students live where students must face a harsh environment and can affect the quality of learning.

Motivation is a condition within oneself that has the power or power to move, encouraging the individual to do something to achieve a goal. As expressed by Sardiman, 2017: 74) that motivation is stimulated because of the existence of goals. There are two types of motivation, namely intrinsic motivation, and extrinsic motivation. Generating learning motivation is needed the right method. Method is a strategy that can support the success of an activity, as well as efforts that reap maximum results most likely derived from the suitability of the method used. According to Marjuni (2014) in educational activities, the role of methods is very influential on the purpose of education itself. The choice of a method depends on the ability of educators to organize, select, apply, and liven up the learning atmosphere using the method.

Oemar Hamalik (Yunita, 2017) concluded that in motivation there are three related elements, namely (a) motivation starts from a change in energy in the person (b) motivation is characterized by the emergence of arousal affective feelings (c) motivation is characterized by reactions to achieve goals. According to Sardiman (Yunita, 2017) learning motivation indicators are as follows: 1. Diligently face task 2. Tenacious in the face of adversity (not easily satisfied) 3. Show interest in a variety of adult issues (e.g., development, political, economic, and other issues) 4. Prefer to work independently 5. Get bored quickly on routine things (things that are repetitive just like that 6. Can defend his opinion. 7. It is not easy to let go of the thing that is believed. 8. Happy to find and solve problems.

The use of learning methods used by teachers also affects student learning motivation. Consequently, researchers apply one method in learning that can develop student learning motivation. The learning method used in this study is a *brainstorming* method to overcome problems that arise in students.

The word *brainstorming* comes from English which means "*brainstorming, expressing opinions*". The use of *brainstorming* methods in history learning is more directed to teach students' creativity in expressing opinions and to develop knowledge and insight (Amin, 2016). The *brainstorming* method is a method for generating ideas that try to overcome all obstacles and criticisms (Lanya & Aini, 2019). In this method, students are required to be more active in expressing their opinions more broadly, gaining knowledge, and striving so that learning outcomes can last a long time mastered by students. Ideas that arise are more numerous and diverse because students freely channel these ideas without criticism. In line with Tampubolon's opinion, (2020) that the advantages of the brainstorming method include: building knowledge, improving mental abilities and helping students learn without criticism, rules or evaluation in limiting restrictions on generating ideas. Giving opinions in problem solving can be done deductively, namely from general concepts to specific concepts. Mismatch in the selection of learning methods can sometimes hinder students' understanding of learning material.

According to Djamarah (Yunita, 2017), the conventional learning model is a traditional learning model or also called the lecture method, because this method has long been used as an oral communication tool between teachers and students in the learning and learning process. In conventional history learning is characterized by lectures accompanied by explanations, as well as the distribution of tasks and exercises. In conventional learning, the material mastered by students will be limited to what the educator masters, because what the educator gives is what he masters, so what students master depends on what the educator masters. Learning activities with conventional models become verbalists. Educators rely only on verbal language and learners rely only on their auditive skills.

Brainstorming Often used in group discussions to solve problems together. According to Yunita (2017) the learning steps that use brainstorming strategies are as follows: a) Provision of Information and Motivation The teacher explains the problem to be discussed and its background, then invites students to be active in giving their responses. b) Identity At this stage students are invited to contribute as many suggestions as possible. All incoming suggestions are accommodated, written, and not criticized. Group leaders and participants may only ask questions to ask for explanations. This is so that students' creativity is not hampered. c) Classification All participant suggestions and inputs are written. The next step is classifying based on criteria created and agreed upon by the group. d) Group verification by jointly reviewing the contributions of suggestions that have been classified. Each suggestion was tested for relevance to 58 issues. If there are similar suggestions, one of them is taken and irrelevant suggestions can be crossed out. To the contributor of advice can be asked for argumentation. e) Conclusion The teacher/group leader and other participants try to conclude the agreed alternative items. After all is satisfied, then the final agreement is taken the way that is considered the most appropriate. While the conventional learning steps in general are a. The teacher gives apperception b. explains the teaching material verbally c. gives examples, d. the teacher opens the question-and-answer session and continues with assignments e. the teacher continues by confirming the tasks done by the students and f. the teacher concludes the core of the lesson. The advantages of the brainstorming method are as follows: a) Students actively think to express opinions. b) Train students to think quickly and logically. c) Stimulate students to always be ready to argue according to the problems given by the teacher. d) Increase student participation in receiving lessons. e) A less active student gets help from a clever friend or from a teacher. f) There is healthy competition. g) Students feel free and joyful. h) An atmosphere of democracy and discipline can be fostered.

Based on research conducted by Yuniati et al., (2014) shows that the use of brainstorming learning models affects students' mathematics learning outcomes. Furthermore, Nahdi, (2019) also found that the improvement in mathematical communication skills of students who received Round Robin's Brainstorming-based learning was better than students whose learning used conventional models and Junita et al., (2020) stated that there was a significant influence on the application of the Brainstorming learning model on the mathematics learning outcomes of Class VIII students of SMP Negeri 1 Tanjung Sakti PUMU on cube material in the 2017/2018 academic year.

Based on the description above, the formulation of the problem in this study is: "Is there a positive and significant influence of the brainstorming method on learning motivation and learning outcomes on integrative thematic learning sub-theme of togetherness in the diversity of MIN Demangan grade IV students?" and the formulation of the hypothesis in this study as follows: a. there is a positive influence of increasing student motivation between experimental groups (with brainstorming methods) With the control group (with conventional methods), b. there was no positive effect on increasing student motivation between the experimental group (with brainstorming methods) and the control group (with conventional methods). Therefore, researchers are interested in making

a study entitled "the influence of brainstorming learning methods on the learning motivation of grade X students of SMK Koperasi Pontianak".

METHODS

This research is experimental research using a quantitative descriptive approach. In this study, researchers set SMK Koperasi Pontianak as the research location. This study used pretest-posttest with nonequivalent groups. The population consists of 65 students divided into two classes, namely class X AKL, X BDP for the 2022-2023 academic year. The samples in this study were randomly taken using purposive random sampling techniques. Random sampling is done by lottery using small paper written with the name of each group.

This study has one independent variable in the form of brainstorming methods, and one dependent variable in the form of learning motivation in mathematics learning. Researchers took two classes, namely class X BDP consisting of 19 students as an experimental class and class X AKL consisting of 17 students as a control class. The study used a group design before and after the test. This study used a control group, two different treatments, and random sampling, so that pre-test and post-test group designs were used. The survey is conducted once, after the learning process.

Data collection techniques in this study were carried out by questionnaires and documentation. The validity of the instrument is carried out by experts in the field of study (professional Judgement). Analysis of the validity of student motivation questionnaires on mathematics learning with analysis includes the correlation of each statement item. The procedure for estimating measurement reliability by computational coefficient- α is used if each hemisphere is of equal length or contains the same number of items.

Descriptive analysis is used to describe the condition of students on student learning motivation and learning outcomes both before and after learning in both classes, namely experimental group I, experiment II, and control group. Inferential analysis is used to test hypotheses regarding the influence of learner learning motivation and learner learning outcomes on experimental and control groups. Such influence testing is used t-test. Before the test is carried out, an assumption test is first carried out as the basis for independent t testing, the assumption test in question is a normality test and a homogeneity test. The collected research data were analyzed by normality test using chi-squared formula. The chi-squared test criterion is rejected if with $H_0 x^2 \geq x^2_{(1-\alpha)k-\alpha}$ $\alpha = 5\%$, and accepted, if). After that, conduct a homogeneity test of the sample part. The test criteria are acceptable, if $H_0 x^2 \leq x^2_{(1-\alpha)k-\alpha}$ $H_0 F_{count} < F_{\frac{1}{2}\alpha}(n1-1, n2-1)$.

RESULTS & DISCUSSION

Results

In this study, researchers used the brainstorming method to motivate learning mathematics grade X SMK Koperasi Pontianak. As a control class is class X AKL which totals 17 students, and as an experimental class is class X BDP which totals 19 students. The average score of research results obtained from the questionnaire of students' mathematics learning motivation in the control class was 71.8, and in the experimental class was 82.3. This shows that the condition of both samples of both the control class and

the experimental class originated from the same state. As for after being given treatment, the experimental average became 84.2, and in the control class it became 73.2.

The average experimental score was higher than that of the control class. This is due to differences in the treatment of sample classes. Learning using the brainstorming method given to the experimental class obtained better results than the control class which only used the lecture method.

Based on the results of data analysis through the normality test, it is obtained that the data is normally distributed, because in all data obtained X^2 calculate $< X^2$ table, with $dk = 5$ and $\alpha = 5\%$. Therefore, data analysis can be carried out to the next step. In the pre-test homogeneity test obtained $0.37 < 2.20$, with $dk = 17/19$ and $\alpha = 5\%$ which means the population has a homogeneous variance. In the homogeneity test, the results showed no average difference in the control class and the experimental class by showing $F_{count} < F_{table}$.

Based on the results of the final data analysis (post-test) through the normality test, it was obtained that the data was normally distributed, because all data obtained X^2 calculated $< X^2$ table with $dk = 17/19$ and $\alpha = 5\%$. On the post-test homogeneity test $F_{count} 0,17 <$, so H_0 is accepted which means there is no difference in class variance. Furthermore, the value on the t-test (post-test) shows that $T_{count} 0,0903 < T_{table} 2,042$, it explains that there is a difference in the control class and the experimental class.

From the description above, if you pay attention, it turns out that there is an influence of learning motivation in both classes. This shows the difference in the use of the brainstorming method with the lecture method on the motivation to learn mathematics of grade X students of SMK Koperasi Pontianak.

Discussion

In this study, researchers used a questionnaire instrument of student learning motivation scale which was used to collect learning motivation data. In addition, researchers also use observation guidelines related to the learning implementation process using the method of giving recitation and brainstorming. Data analysis techniques used descriptive statistical data and inferential t-test with the help of computerization.

Based on observational research in the form of student mathematics learning motivation tests in describing the differences in the use of brainstorming methods in class X of SMK Koperasi Pontianak, distributing questionnaires to 65 students of grade X AKL and X BDP, with 20 statements of motivation to learn mathematics. This research is a quantitative research using the *pretest homogeneity test of the control class and experimental class followed by the posttest homogeneity test of the control class and experimental class*, the research also uses quasi-experimental design which is divided into two classes, namely the experimental class and the control class. This research will be conducted on April 5 – April 6, 2023.

The hypothesis that has been formulated will be tested statistically-parametrically with a t-test. Sugiyono, (2019) stated that the effect of treatment can be analyzed in different tests using t-tests. Before testing the hypothesis, normality and homogeneity testing will be carried out to meet the requirements of the t-test statistical-parametric test. So that before the t-test is used, it first conducts a normality and homogeneity test.

The brainstorming method is one form of teacher effort to teach students to be able to arouse student learning motivation. The use of learning methods has an important role in increasing student learning motivation. The brainstorming method can gather ideas, opinions, information, knowledge, and experience from all learners. Any ideas that emerge from each learner's massing are not immediately responded to. This method is based on the opinion that a group of learners propose more than their respective members. In this

method, a question is presented, then the students are invited to submit any ideas about the problem. Strange ideas are not rejected a priori, but analyzed, synthesized, and evaluated as well. It may be an unexpected solution that finally appears. Learning carried out by the brainstorming method can provide opportunities for students to argue so that they can train students' critical power and analysis.

While learning with conventional methods does not have a positive influence on learning motivation in learning. This is because the existence of one type of learning method used from time to time makes students feel bored. The lack of creativity carried out by teachers in choosing the right learning method makes learning monotonous. Learners do not have the opportunity to actively interact in learning. The role of educators tends to be dominant in making student participation low and less interested in the learning process, resulting in low student learning motivation. Learning with conventional methods makes students listen more to the teacher's explanation. Learning is centered on the teacher as an informer, thus making students passive. Learners receive knowledge from the teacher, and knowledge is assumed to be a body of information and skills that he possesses according to standards.

Noordiana (2016) revealed that learning that provides opportunities for every learner in problem solving can stimulate critical thinking patterns. The selection of a good and appropriate and planned learning design can show a learning atmosphere full of involvement. Aldeirre, Komala, and Heryanti (2018) revealed that the critical thinking process of students will increase if learning is carried out using the brainstorming method because this method provides opportunities for students to express their opinions without fear and criticism. This then makes children able to think critically in finding solutions to be solved. The results of this study are also supported by Utami's (2015) research that learning motivation can increase after learning using brainstorming. In addition, Assadianie (2019) in his research concluded that the application of brainstorming methods can improve students' critical thinking skills. Similarly, Amin (2016) shows that the brainstorming method helps encourage students to express their opinions gradually in history learning. It turns out not only in history subjects, but in other subjects as well as the conclusion of Mayendra (2017) research that students' ability to speak in public can develop with the right stimulus from educators. Students are more active in speaking in class or subjects that researchers present. The brainstorming method applied can improve student learning outcomes because the learning process becomes very interesting so that it can lead to increased student learning motivation (Hairunnisa, 2017). Students are naturally encouraged to be active in discussing and collaborating with their fellow group mates (Karim, 2017).

CONCLUSION

Based on the results of the research and discussion above, it can be concluded that the average questionnaire value in the control class, namely before the conventional method, reached 71.8 and after applying the conventional method reached 73.2. While the average questionnaire score in the experimental class before the brainstorming learning method reached 82.3 and after the brainstorming learning method was applied reached 84.2. From the results of the known t-test, there is an influence of the use of brainstorming methods on students' motivation to learn mathematics. There was a difference in the average score of the experimental class questionnaire increased higher than the average of the control class $T_{count} 0,0903 < T_{table} 2,042$. This brainstorming *method* encourages students to actively learn and do tasks, as well as be active in arguing without fear of being wrong. This makes them motivated in learning. The results of the study imply that related

parties, especially teachers and schools to apply this *brainstorming* method so that students can be motivated to learn. It can support satisfactory learning outcomes.

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