The Application of Token Economy Method to Increase the Middle School Students' Motivation in Learning Mathematics

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ABSTRACT

The present research is aimed to know the effect of the application of the token economy method on mathematics learning motivation. The experiment was set as the research method. The variables in this study were the token economy method as an independent variable, learning motivation as the dependent variable, and learning achievement as the control variable. The subjects used in this study were grade seven students in one of the junior high schools in Sengkang, one of the districts in Indonesia. Based on the descriptive analysis, it is found that in general, before being given the treatment, both the experimental group and the control group have a low motivation to learn mathematics. Furthermore, after being given the treatment, it can be suggested that the subjects who are given the token economy method have higher learning motivation compared to the subjects who are not given the token economy method.

Keywords: Mathematics, learning motivation, token economy method

1. INTRODUCTION

Motivation is important in a learning process because its existence is very meaningful for learning activities. Turner and Johnson [1] suggested that the development of motivation given from the beginning has a strong influence on one's learning abilities. Learning outcomes will be optimal if there is motivation. The more precise the motivation a student has, the more successful the student's learning process will be. Motivation will always determine the intensity of learning endeavors for students [2].

Especially in mathematics, learning motivation is an important factor in supporting students to obtain optimal achievement. Low motivation to learn mathematics is not only determined by personal factors, but also environmental factors or external factors. Strengthening or reinforcement is one of the external factors in learning motivation [3]. Besides that, Santrock [3] suggested that awards that convey information about students' abilities in learning can increase intrinsic motivation by increasing student competency. Furthermore, Santrock [3] analyzed that out of one hundred studies, it suggests that awards do not always reduce students' intrinsic motivation. Verbal rewards in the form of praise and positive feedback can increase students' intrinsic motivation. Giving a real award in the form of a gold star symbol according to student performance can maintain students' intrinsic motivation.

Boniecki and Moore [4] suggested that a token economy is a form of positive reinforcement. A token economy is a form of behavior modification through positive reinforcement based on the principle of operant conditioning. In this case, positive reinforcement can be in the form of gifts, awards, and praise. The token economy method is a method used to reinforce students' positive behavior in a classroom. The environment is structured and controlled in such a way as to attempt to change behavior. According to MacMillan [5] the token economy has many advantages, i.e., 1) token provides reinforcement immediately for all group members with common objects, 2) tokens are not managed by children so reinforcement is not delayed, 3) as it uses a thing such as money, the behavior is gradually carried over into the subconscious and increase the strength of natural reinforcement, and 4) because tokens have supportive strengthening variations, the situation will not be saturated.

Furthermore, Boniecki and Moore [4] argued that the use of prizes and praise is one way to motivate students. Besides, Levine and Fasnacht [6] stated that the use of

prizes in learning mathematics could increase motivation to learn mathematics. Willingham [7] suggested that the economy was important for learning at all age levels. The advantage of implementing the token economy is that tokens can be used to strengthen the target behavior immediately after the target behavior is formed. Students are taught trying to collect tokens to get something they want. The application of the token economy in class can attract students' attention, so students can study longer and do productive activities. Furthermore, Heaton et.al. [8] stated that the token economy program has succeeded in reducing deviant behavior, increasing learning effort, and leading to higher learning achievement. The findings of Rollins et.al [9] show that the application of the token economy can improve the learning achievement and intelligence of elementary and middle school students. Test scores obtained by students are higher than scores obtained previously. Students exhibit positive behavior and spend more time doing school work. Based on the explanation above, the present research is aimed to know the effect of the application of the token economy method on the motivation to learn mathematics.

2. METHOD

As it would compare two groups of students of which they were respectively taught with and without token economy application, then the experiment was set as the research method. The variables in this study were the token economy method as the independent variable, learning motivation as the dependent variable, and learning achievement as the control variable. The token economy method is a behavior modification technique, where the token will be given as soon as possible after the desired behavior to students based on a fixed ratio, i.e., a certain number of responses will determine the next reinforcement.

Learning motivation is an impetus that is found in students to make changes in learning behavior so that the desired goals of students can be achieved. Student learning motivation is measured using a scale of learning motivation. Student learning motivation is said to be high if the scores obtained by students are high, and, vice versa, students' learning motivation is said to be low if the scores obtained are low. Learning achievement is the value obtained by students according to their competence. Learning achievement is measured using achievement tests which include aspects of application and analysis. Learning achievement is said to be high if the score obtained is high, and vice versa learning achievement is low if the score obtained is low.

The subjects used in this study were grade seven students in one of the junior high schools in Sengkang, one of the districts in Indonesia. The purposive sampling technique was set as the sampling technique. The sample was chosen based on the results of a mathematics learning motivation scale, i.e., specifically the students

with a low score, and students' achievement tests that have a middle and low score. The data collected in this study were the number of tokens that students get when they express certain behaviors, learning motivation scales, and achievement tests. The scale of the learning motivation was arranged based on the intrinsic aspects proposed by Santrock [3] [10], namely understanding the subject matter, being happy to follow the lesson, putting attention to the lesson, feelings when attending the lesson, learning because of their own volition, and encouraging learning needs. The choice of the answers on a scale consists of very inappropriate, not appropriate, appropriate, and very appropriate which results in scores 4, 3, 2, and 1 respectively. Furthermore, the experiment was given between pre-test and post-test. The analysis would apply a t-test to assess the null hypothesis whether it is accepted, i.e., there is no difference between students' motivation in the experimental group and those of in the control group.

3. FINDINGS

Based on the descriptive analysis, it is obtained an illustration that in general, before being given the treatment, both the experimental group and the control group had a low motivation to learn mathematics. Meanwhile, after being given treatment, the subjects in the experimental group have their motivation increase, i.e., from 57,42 in the pre-test to 63,42 in the post-test. In contrast, the subjects in the control group do not experience increased motivation from 57,47 in the pre-test to 56,40 in the post-test.

Based on the results of the data analysis, it was found that the subjects who are given the token economy method had higher learning motivation compared to subjects who were not given the token economy method. These results are indicated by the t-value 5,108 and the significance of 0,000 with the rule of $p < 0.05$, which can be concluded that the alternative hypothesis is accepted. Based on this, it can be seen that there is a significant difference between students' motivation to learn mathematics given the token economy method and students who are not given the token economy method. Mathematical learning motivation of subjects given the token economy method is higher than that of subjects who are not given the token economy method.

4. CONCLUSION

Based on the results of data analysis, it can be concluded that there is a significant difference between the motivation in learning mathematics of students who are given the token economy method and students who are not given the token economy method. The difference can be known by looking at the average difference in the score reduction in mathematics learning motivation scale between groups who get the application of the token

economy method and those who do not get the application of the token economy method. The group that received the application of the token economy method had a higher score increase compared to the group that did not get the application of the token economy method.

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