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# Application Of Leaflet Media In Learning Missouri Mathematics Project (Mmp) Model Against Independence of Student Mathematics

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#### Abstract:

Independence learning is a condition for someone to determine the decision on an initiative to solve learning problems through self-confidence owned. This study aims to determine: 1) Student responses to the application of leaflet media in MMP model learning; 2) The attitude of independence in learning mathematics students after the use of media leaflets in learning MMP models; and 3) The effect of media leaflets on MMP model learning on students' mathematics learning independence. The research method uses a pseudo experimental design. The study population was class X Islamic Center Cirebon District with a total of 87 students and the sample was taken based on cluster random sampling technique, namely obtained class X AKL2, amounting to 30 students. The research instrument used was a questionnaire with descriptive data analysis techniques and simple regression analysis. The results showed that: 1) The average score of the response of the media leaflet in MMP model learning was 81.3; 2) The average score of students' mathematics learning independence is 69.03; and 3) the effect of the application of the leaflet media in MMP model learning to students' mathematics learning independence by 50.4%, with a regression equation Y = 62.185 + 0.084X.

Keyword: Independence Learning Mathematics, Leaflet, Missouri Mathematics Project

### Introduction

The use of learning methods or models carried out by a teacher is inseparable from the help of media and other learning tools. The problem that usually occurs in learning today is that students' activities in participating in learning are still considered passive. Learning tends to be centered on the teacher, when explaining concepts rarely use concrete media so students only accept explanations from the teacher without understanding (Dwiningrat, Suniarsih, & Manuaba, 2014, p. 3).

The unavailability of mathematical learning tools to increase learning independence is evidenced by the large number of teachers who have not been able to make and understand learning devices that aim to increase student independence (Faroh, Sukestiyarno, & Junaedi, 2014, p. 99). Mathematics is a science that must be learned at every level of education, this is because mathematics can train someone to think logically, be responsible, have a good personality and have the skills to solve problems in daily life (Lestari, Munawaroh, & Handoko, 2019, p. 29). According to Handoko teachers must be able to design learning for active students in learning so that the material is delivered and students are able to solve problems (Anike & Handoko, 2018, p. 110).

According to Izzati (2015, p. 55) states that students do not immediately understand mathematical material only in learning activities in class. Some differences in characteristics sometimes cause students not to directly master mathematical material. This problem was also found in students

of class X AKL 2 SMK Islamic Center Cirebon District. But there are also external factors for students such as teaching materials or learning media. Therefore, in this study using leaflet media so students can repeat reading mathematical material without feeling heavy when carrying it.

Independence to learn mathematics (Natalia, 2016, p. 109) is the readiness of individuals who are willing and able to learn on their own initiative to master a mathematical competency based on their knowledge, then the student is active in learning, has a desire to compete for his own good, have confidence in completing tasks, do not feel dependent on others, learn without being ruled by others, able to make decisions, and take responsibility for what they do and act according to the values taught. Learning mathematics is a mental activity in thinking to practice systematic answers. However, to learn mathematics does not escape the difficulties caused by lack of understanding so that it affects the completion plan. (Handoko & Winarno, 2019, p. 412).

Student independence does not develop due to the learning that is carried out is still a teacher center. In general, teachers still apply conventional learning methods such as lecturing, taking notes, and giving assignments without being discussed again so that students' learning independence is still low (Suhendri & Mardalena, 2015, p. 106). Teachers who tend to dominate the learning process can influence student learning activities during learning, one indicator of learning independence is active students in the learning process involving various sources and activities such as independent learning activities (Kurniawati, 2010, p. 35).

According to Suhendri (2011, p. 30), learning independence is an important element in learning mathematics. This is because learning resources are not only centered on the teacher. There are learning resources outside the teacher, such as: the environment, the internet, books, experiences, and others. Students who have high creativity tend to feel insufficient about the subject matter obtained from the teacher. So they seek information from outside the teacher. As a result the student's knowledge will increase. Therefore, the independence of student learning is also very important in mathematics learning activities. But in the field, there are still many students who are dependent on the teacher in terms of learning resources.

In order to support learning activities, a learning media is needed that can support students' dependence on teachers in terms of learning resources. Many learning media that can be used by students one of which is leaflets. According to Notoatmodjo (2003, p. 56) that leaflets are a form of delivering information or messages through images that can be folded. To be easily understood by students the leaflets are designed with illustrations and simple language is also short (Amri & Ahmadi, 2014, p. 173). Leaflets can make students interested in learning because of their appearance and also the contents are not complicated so it is easy to read (Winarso & Yulianti, 2017, p. 13). The reason for choosing the leaflet media compared to other learning media is because the leaflet contains information that is easy to read at a glance by students, is simple and very inexpensive, easy to carry because it is small and lightweight, can facilitate understanding and increase student enthusiasm.

The learning model chosen by the teacher is one of the factors driving students to learn independently. One learning model that supports students to learn independently is the Missouri Mathematics Project (MMP) learning model, the MMP model is designed to combine independence and collaboration between groups. By studying in groups students will better understand difficult concepts by discussing and exchanging opinions with their friends (Jannah, Triyanto, & Ekana, 2013, p. 62). The reason for choosing the MMP learning model compared to using other learning models is because the MMP model is a structured learning model, the sequence of steps in the MMP model is the introduction or review, development, controlled training, independent work, and assignments.

#### **Method Research**

This research will be conducted on class X students at SMK Islamic Center Cirebon with a duration of about 4 months. This research is a quantitative experimental research method. The population used is class X of the 2019-2020 academic year SMK Cirebon Islamic Center. The research sample was taken based on cluster random sampling technique so that it was obtained class X AKL2 totaling 30 students. Research activities included a questionnaire before learning using leaflet media in the MMP model and a questionnaire after learning.

Data collection techniques using a questionnaire instrument. The research questionnaire consisted of a leaflet media response questionnaire in the MMP model and a student mathematics learning questionnaire independence. The questionnaire used in collecting research data has passed the results of the validity and reliability tests. The results of the questionnaire calculations were analyzed descriptively and statistically.

The technique of analyzing research data based on the research objectives is a simple regression test. Regression test in this study was to determine the regression equation and the coefficient of determination. Regression equations are used to determine the independence score patterns for learning mathematics through mathematical equations. The coefficient of determination test is used to determine the size factor of the application of the leaflet in the MMP model to the independence of students' mathematics learning.

# **RESULTS AND DISCUSSION**

#### Results

In this study, mathematics learning uses leaflet media which is applied to the MMP learning model. The mathematical topic in the leaflet is a series of rows. Each student is given a leaflet so they can study independently not fighting over with other friends. In its implementation, the researcher has prepared three leaflets for 6 meetings during the study on the topic of sequences and sequences.

The leaflets in this study have been adapted to the material and objectives of learning mathematics in class X, especially in the Vocational School Islamic Center in Cirebon Regency. Students learn independently using leaflets when learning mathematics and the teacher supervises the

learning. students can directly ask when there are things that need to be explained directly by the teacher. Leaflets are used in learning mathematics with the aim to determine the independence of students learning mathematics. The reason researchers used the leaflet was because the elements in the leaflet itself consisted of pictures, text, material illustrations, and were presented briefly according to the essence of the row and sequence material. In addition, leaflets are easy to carry so students can easily read and understand mathematical material.

#### **Description of Response Media Leaflets in MMP Model Learning**

The leaflet media questionnaire in the MMP learning model consisted of 25 statements which were then distributed to 30 students. To find out the response of the leaflet media in the MMP model, the data that has been entered is then processed with SPSS. The standard deviation of mathematics learning independence data is known to be 11.861 with 140.7 variants. Student responses to the media leaflet in learning the MMP model in mathematics learning is quite good. Media mathematics leaflets can be collaborated with learning models in order to obtain better student learning outcomes and mathematical abilities. To find out the acquisition of percentage description of the leaflet media response questionnaire in MMP model learning will be calculated from the questionnaire score using the Microsoft Excel application.

From the research known to be around 62%, meaning that students respond that they have no difficulty using leaflet media in learning the MMP model when learning mathematics. The happy aspect is around 64%, meaning that students already have a sense of pleasure in the use of media leaflets in learning MMP models when learning mathematics. The aspect of interest is around 63%, meaning that students already have an interest in learning mathematics using the media leaflet in learning the MMP model. Motivation aspect is around 68.5%, meaning students feel the leaflet media has motivated mathematics learning and the display aspect 68% means students respond positively to the appearance of the media leaflet in MMP model learning. From each aspect it is known that not all aspects are classified as very high student responses. So that each needs improvements that encourage students to be better.

### Description of Independence Learning Mathematics After Application of Media Leaflet

The independence data of students' mathematics learning was obtained from the results of the distribution of instruments in the form of a questionnaire with a total of 21 statements filled out by 30 students.

The standard deviation of student mathematics learning independence data is known to be 8.958 with a variance of 80.24. The independence of learning mathematics after learning mathematics using leaflet media in the MMP model is quite good. The independence of learning mathematics can be enhanced by the use of appropriate mathematics learning media based on the topic of the material.

Basically the independence of learning mathematics students using instructional media needs good supervision from the teacher during the learning process. Good instruction and supervision during learning become a necessity that must be prepared by the teacher. In this study, researchers still need instructions for the use of leaflet media in MMP model learning that is improved even better.

To find out the percentage of the independence questionnaire description will be calculated from the questionnaire score using the Microsoft Excel application.

While the indicators evaluating learning activities are still relatively low at 56%. The aspect of being confident about one's own ability is 68%, the initiative aspect is 62%, the responsibility aspect is 74%, and the evaluation aspect is 56%. Of the five aspects that the responsibility has the largest percentage and the evaluation aspect has the smallest percentage. In other words, students already have a good sense of responsibility for their learning activities, but do not have enough ways to be able to evaluate their activities individually.

From the regression equation, the independence of students' learning mathematics after applying learning using leaflet media was 62.185. Regression coefficient of 0.084X states that each increase in the intensity of the use of media leaflets in the MMP model will affect the independence of student mathematics learning by 0.084 one unit. it can be interpreted that the use of media leaflets in MMP model learning affects the independence of students' mathematics learning by 46.51%, while 53.49 % is influenced by other factors.

# Discussion

This study aims to determine the characteristics of students' mathematics learning independence, to determine students' responses to mathematics learning after using leaflet media in MMP model learning, and to determine the effect of the use of media leaflets on students' mathematics learning independence. In the process of learning mathematics activities in the classroom, researchers used three leaflets as much as a media leaflet.

The results of the calculation of descriptive statistics questionnaire responses media leaflet Table 1 of 30 students obtained an average value of 81.3, a minimum value of 63, a maximum value of 103, a range of 40, a standard deviation of 11.861 and a variance of 140.7. From an average result of 81.3 while the maximum score is 103 so it can be said that students respond positively to the use of leaflets in the MMP model in their mathematics learning. The results of the standard deviation scores and variants can be seen that the response rate of using the questionnaire leaflet varies.

On average the independence of students learning mathematics in this study there is a close relationship to aspects of student learning responsibility. Students in relation to the independence of learning mathematics apparently still lacks in the evaluation aspects of learning activities. Mathematical learning activities of students in the classroom have the characteristics responsible for mathematics lessons. All student learning activities such as taking notes, understanding mathematical material using leaflets can be well done by students during the process of learning mathematics in class. This is supported by the habit of students not to depend on others when studying mathematics.

On the other hand, the evaluation indicators of learning activities still need to be improved. In this study, students are still unable to evaluate learning activities. Based on the results of tracing the answers to the math practice work provided in the leaflet there were still students who had difficulty working on the problems. This is an indication that students need more intense activities in achieving understanding through media especially leaflets. And based on table 4, it was found that the leaflet media still had weaknesses, namely lack of ability to make students have new ideas about learning mathematics, lack of initiative to do themselves, and confidence in their own abilities.

Learning independence is a condition of someone who has a desire to compete to advance for his own good, is able to take decisions and initiatives to overcome the problems faced and has confidence in doing the tasks and being responsible for what he does. Learning independence in this study is reviewed from the activities or attitudes of students in learning activities and is able to use the skills they have to support the learning process. To determine the independence of learning in this study using a research instrument in the form of a Likert scale 1-5 questionnaire.

Leaflets are learning media in the form of sheets of paper usually in the form of A4 with pictures and writing on both sides folded into three equal parts. Leaflets are a medium for delivering information or messages in the form of sentences, images or a combination of both. This study uses leaflet media containing mathematical and sequential mathematical material content and is equipped with illustrations and also examples and practice questions. Leaflets are distributed to students with one student leaflet.

The process of making leaflets in this study starts from determining what material you want to make in the form of leaflets, namely the row and series material for class X vocational high school students. Then start typing the row and series material in Microsoft Word applications with a format such as a leaflet. After that, the process of creating a leaflet design and copying the results of the material type to the Corel Draw application Furthermore, the results of the leaflet design are printed and validated by the supervisor, after going through revisions and have been declared valid, the leaflets are ready to be reproduced and used for research.

The results of the descriptive statistical calculations questionnaire independence of learning mathematics students in Table 2 of 30 students obtained an average value of 69.033, a minimum value of 53, a maximum value of 84, a range of 31, a standard deviation of 8.958 and a variance of 80.240. From the average results of 69.033 while the maximum score is 84 so it can be said that the independence of learning mathematics is quite good. The results of the standard deviation scores and variants can be seen the level of independence of students learning mathematics is very diverse.

The activity of evaluating mathematics learning activities still needs to be given attention from the teacher. Participatory student attitudes such as having a personal note about rewriting the results of understanding mathematics learning using the media leaflet in the MMP model. Still found some students who do not have a record of mathematical material. These conditions resulted in students still confused making steps to solve the problems given. Therefore, the use of leaflet media in the MMP model must still be monitored by the teacher and student activities at home such as making a summary of the material need to be confirmed every week.

Students with active participatory activities in the classroom during mathematics learning using leaflets demonstrate an attitude of independence in learning mathematics. Students can work on math problems with media guide leaflets and resume notes written in notebooks. During the research, students were found to complete the contents of the material in the media leaflet with other sources such as the internet or books. This condition is complemented by the results of the distribution of student questionnaires on indicators of individual responsibility in learning by 81% and indicators of own desires for learning by 71%.

From the results of the linearity calculation of 0.00, this shows a linear relationship between variables because the significance level is equal to 0.00. As for the results of the analysis data it is known that there is an influence of the use of leaflet media on the independence of students' mathematics learning, this can refer to the results of calculations using SPSS 20, from the results of the regression analysis has a coefficient of determination (R Square) of 0.491. This means that 46.51 dependent variables using the media leaflet are explained by the independent variables of students' mathematical independence results and the rest are explained by other variables outside the variables used and the regression equation that is Y = 62.185 + 0.084X.

The influence of the use of leaflet media in MMP learning model on the independence of students' mathematics learning based on the determinant table output of 46.51% and about 53.5% of the rest is influenced by other factors outside the variables in this study. Students give a positive response to the use of leaflet media in learning the MMP model. There are still improvements to the success of the continued use of leaflet media in the MMP model when learning mathematics.

#### **Conclusions And Recommendations**

#### Conclusion

Based on the explanation of the results of the study and the discussion above, the researcher can conclude the study as follows: The average score of students 'responses to the application of leaflet media in MMP model learning is 81.3, students' responses related to the application of leafet media in MMP model learning towards learning independence student mathematics is quite strong at 65.1%. The average score of the students 'mathematics learning independence score was 69.03, the students' mathematics learning independence was strong which was 64.75%. Regression equation: Y = 62.185 + 0.084X, the correlation rate of 50.4%, the determination test obtained 46.51% of the application of the media leaflet in the MMP model learning affect the independence of students' mathematics learning.

# Suggestion

For teachers to train the independence of students' mathematics learning through the use of leaflet media combined with appropriate learning models. For further research, leaflets can be used to

measure students' mathematical ability variables. In general the leaflet media must be based on an attractive, concise design, and encourage students to read.

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