

**PENERAPAN *MISSOURI MATHEMATICS PROJECT* (MMP) PADA POKOK
BAHASAN DIMENSI TIGA DITINJAU DARI HASIL BELAJAR
MATEMATIKA BERDASARKAN TAKSONOMI BLOOM**

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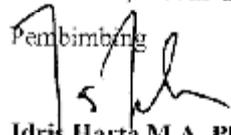
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**THE IMPLEMENTATION OF MISSOURI MATHEMATICS PROJECT
(MMP) MODEL TO MATHEMATICS STUDENT
ACHIEVEMENT BASED ON BLOOM TAXONOMY ON
MATERIAL OF THREE DIMENTION**

By

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ABSTRACT

The purpose of this research is to analyze: (1) the influence of the use of Missouri Mathematics Project (MMP) model to student's mathematics achievement, and (2) the interaction between the use of Missouri Mathematics Project (MMP) model and cognitive dimension on bloom taxonomy to student's mathematics achievement. The populations are all students of grade X of 2012/2013 academic year in SMA IKIP Veteran III Tambakromo. Sample taken in this research as many as two classes, consist of X 1 as experiment class with 25 students and X 2 as control class with 26 students. The sampling technique used in this research is cluster random sampling. Data collection methods used are method of test and documentation method. Data analysis techniques use two ways analysis of variance with unequal cells, a prerequisite test used the Lilliefors method to normality test and the Barlett method to homogeneity test. From the analysis of data with 5% of significant level, it is satisfied that : (1) there is influence of the use of Missouri Mathematics Project (MMP) model to student's mathematics achievement with $F_A = 11,76$ and use of conventional model to student's mathematics achievement with $F_B = 23,81$, and (2) there is no interaction between the use of Missouri Mathematics Project (MMP) model and bloom taxonomy to student's mathematics achievement with $F_{AB} = 1,59$.

Keyword : Missouri Mathematics Project (MMP) model, Conventional Model, Bloom Taxonomy

1. INTRODUCTION

In this competitive era of globalization, every country should have been able to explore its human resources for the betterment of the nation as a maximum. According M.Jumali (2008:22), education as a learning activity has been done the same age as the man himself educational actors. So men as the actors perform a process of education which is called the learning process.

At this stage there is a process to achieve a holistic behavior change. Changes not only focus on the addition of knowledge because this process can touch individual dimension in the long process (Aunurrahman, 2012:109). These changes are called achieved learning outcomes. Furthermore, the study with the instructional goals, concerns about the expected behavior of the learning process and result is expressed as achievement.

According to data from TIMSS (Trends in International Mathematics and Science Study) 2011 International Mathematics Result in average overall grade 8 mathematics in Indonesia is only 386, while the TIMSS scale using 500 as a central point of the constant reference point of assessment to assessment. Average mathematics in terms of cognitive dimensions that include comprehension of 378 (31%), the application of 384 (23%) and reasoning 388 (17%) (Ina et al., 2012: 462). Of the cognitive aspect of these figures are far from the target, of which 35% for comprehension, 40% and 25% for the application to reasoning (Ina et al., 2012: 86). Data from the IEA also formed Progress in International Reading Literacy Study (PIRLS) is still quite astonishing when it turned elementary school students from Indonesia were able to win the prestigious International Mathematical Olympiad, Wizard at Mathematics International Competition (WIZMIC) 2011 which took place in India. It can be concluded that the quality of education in Indonesia is not really bad, just some

improvements in learning can make all the students in Indonesian to compete in the international arena.

<http://timssandpirls.bc.edu/timss2011/index.html>

Based on this statement it is necessary to innovation in teaching and learning in the classroom so that students are not just listening to the material submitted by teachers. Such innovations as applied to the learning model used. One of the innovative learning model that is able to create an atmosphere conducive to learning mathematics is learning models Missouri Mathematics Project (MMP). This statement is supported by research Dyah Musitowati (2009) which states that learning models Missouri Mathematics Project (MMP) has developed measures of well-structured. Besides models Missouri Mathematics Project (MMP) has many advantages in the study of mathematics in the classroom, including a lot of material that can be delivered to students because not much time consuming. Besides, students can work on the problems due to the large skilled training provided.

Based on these results we can conclude that the model of Missouri Mathematics Project (MMP) is effective in improving student learning outcomes, but so far the success rate has not been studied using models of Missouri Mathematics Project (MMP) on learning. As stated Benjamin Samuel Bloom (2010: 46) on revised Bloom's taxonomy of education there are six categories of assessment of learning success on the dimensions of cognitive processes. The categories include: remembering, understanding, applying, analyzing, evaluating, and creating.

From the above statement compelled researchers to conduct research on the implementation model of Missouri Mathematics Project (MMP) in the learning of mathematics is based on the cognitive dimension of Bloom's taxonomy of education.

2. RESEARCH METHOD

This study used an experimental research, that is research procedures conducted to reveal a causal link two or more variables to control the influence of other variables. In this research, the independent variables are model of learning. Meanwhile, the dependent variable is student's mathematics achievement. In this case, the influence of application of *Missouri Mathematics Project (MMP)* model will be controlled and viewed to other variables that are mathematics achievement based on bloom taxonomy.

The research is conducted by dividing the subjects into two groups, experiment and control groups. The experiment group is given *Missouri Mathematics Project (MMP)* model through in learning process, while the control group will be subject to conventional model.

The research is conducted in SMA IKIP Veteran III Tambakromo located at Jalan Gunung Panggung, Tambakromo, Ponjong, Gunung Kidul, D.I.Yogyakarta. The population in this study is students of grade ten of SMA IKIP Veteran III Tambakromo in the even semester, which consists of three classes with an average of students every class is 26 people. The researcher takes samples two classes of grade X that are class X 1 as an experiment class uses Missouri Mathematics Project (MMP) model and class X 2 as a control class uses conventional model in mathematics learning.

The sampling technique used in this study is cluster random sampling, this technique using to find sampel if object that will be selecting so many (Sugiyono, 2012: 83). Before being given a treatment, both groups should be used to test whether the experiment class and the control class in a state of balance.

Data collection methods used is method of test and documentation method. Before test is used, they need to be examined whether it is feasible to use in research. Test used is the validity and reliability test. To determine the validity of achievement test, it uses Product Moment

Correlation formula. Whereas, the level of reliability of achievement test use Alpha Cronbach formula.

The technique of data analysis uses two-way analysis of variance with unequal cells. Before doing analysis of variance, prerequisites analysis test must be conducted. It consists of normality test uses the Liliefors and homogeneity test uses Bartlett.

3. THE RESULT OR RESEARCH AND DISSCUSION

Normality test is a test that determines whether the data were analyzed on a normal distribution. The method used in the test is method Liliefors normality at significance level of 5%. Data is said to be normal if $L_{obs} < \alpha$. From the calculations, the following results:

Table 4.4

Normality Test Results Analysis

Source	L_{obs}	L_a	Conclusion
A ₁	0,168	0,171	Normal
A ₂	0,149	0,171	Normal

Description:

A1 = Model Missouri Mathematics Project (MMP) for the experimental class

A2 = conventional model for the control class

From table 4.4 above shows that the significance level of 5% was obtained $L_{calculate} < L_{table}$ we can conclude H0 means that samples come from normally distributed population.

Homogeneity test is a test to determine whether two independent variables have the same variance or not. The homogeneity test in this study by using method of Barlett with significance level of 5%. From the calculations, the homogeneity test results as follows: Tabel 4.5

Hasil Analisis Uji Homogenitas

Source	$X^2_{calculate}$	X^2_{tabel}	Conclusion
Learning Method (between A₁ and A₂)	3,417	3.841	Homogen

From table 4.5 with a significance level of 5% is obtained $X^2_{obs} = X^2$ tabel. This means that the independent variables have the same variance or in other words the data analyzed came from the same population or homogeneous.

With the fulfillment of the nature of normality and homogeneity of variance analysis can be performed. Analysis of variance was used two-way variance with unequal cells obtained summary as follows:

Table.4.6
Summary Analysis of Two Variance Unequal Cells

MODEL	JK	DK	RK	F _a	F _{obs}	P	Decision Rule
MMP	96.89256	1	96.89256	3.84	11.7663	<	Rejected
Conventional	980.4639	5	196.0928	2.21	23.81284	<	Rejected
Interaction	65.79949	5	13.1599	2.21	1.598093	>	Accepted
Error	2198.678	267	8.234749				
Total	3341.834	278					

Based on Table 4.6 above, the two-way analysis of test results with different cells can be interpreted as follows:

1. Test between rows (A)

Calculation results obtained by analysis of variance $F_A = 9.35$ and F table = 6.61 at significance level of 5%. Because $F_A > F$ then H_{0A} rejected. H_{0A} rejected then it can be stated that there are significant use of models Missouri Mathematics Project (MMP) on learning outcomes of students in high school mathematics III Tambakromo Veteran Teachers' Training College.

2. Test between column (B)

Calculation results obtained anava $F_B = 23.81$ and F table = 2.21 at significance level of 5%. Because $F_B > F$ then H_{0B} rejected. H_{0B} rejected then it can be stated that there are significant cognitive dimension

taxonomy bloom on learning outcomes of students in high school mathematics III Tambakromo Veteran Teachers' Training College.

H0B rejected, this means that not all the categories in the cognitive taxonomy bloom dimensions (memorize, understand, apply, analyze, evaluate and create) gives the same effect on students' mathematics learning outcomes. At least two flats are not the same, then the multiple comparison test done to see which one had significantly different mean. Scheffe method used for multiple comparison test. Multiple comparison test results are presented in the summary of the multiple comparison test between the field below:

Table 4.7
Summary analysis Comparison test meanwhile

H_0	F_{obs}	$(q-1)F_{0.10;2;49}$	Conclusion
$A_{1B1} = A_{2B1}$	0.14	4.08	H_0 accepted
$A_{1B2} = A_{2B2}$	0.90	4.08	H_0 accepted
$A_{1B3} = A_{2B3}$	3.30	4.08	H_0 accepted
$A_{1B4} = A_{2B4}$	0.39	4.08	H_0 accepted
$A_{1B5} = A_{2B5}$	10.55	4.08	H_0 rejected
$A_{1B6} = A_{2B6}$	6.58	4.08	H_0 rejected

ANOVA calculation results obtained $F_{AB} = 1.598$ and $F_{table} = 1.96$ at significance level of 5%. Because $F_{AB} < F_{table}$ then H_{0AB} rejected. H_{0AB} rejected then it can be stated that there is interaction between the models Missouri Mathematics Project (MMP) on students 'mathematics learning outcomes based on the dimensions of cognitive taxonomy bloom in SMA III Tambakromo Veteran Teachers' Training College.

From the results of hypothesis testing is known that there are significant uses of learner models Missouri Mathematics Project (MMP) for mathematics learning outcomes based on the dimensions of cognitive taxonomy bloom. The above conditions can be presented in tables and graphs mean mathematics achievement results as follows:

Table 4.8
Average of student Achievement on Experiment Class and Control classs
Based on Bloom Taxonomy

A \ B		Cognitive Dimension Bloom Taxonomy						Total
		B1	B2	B3	B4	B5	B6	
Leaning Model	A1	10.32	11.84	10.96	14.08	10.88	8.64	66.72 (A1)
	A2	10.62	11.08	9.5	13.58	8.27	6.58	59.615 (A2)
Total		20.94 (B1)	22.92 (B2)	20.46 (B3)	27.66 (B4)	19.15 (B5)	15.22 (B6)	126.34 (G)

A = Learning model

A₁ = Missouri Mathematics Project (MMP) model

A₂ = Conventional model

B = Kognitif dimension of bloom taxonomy

B₁ = Memorizing category

B₂ = Knowing category

B₃ = Analyzing category

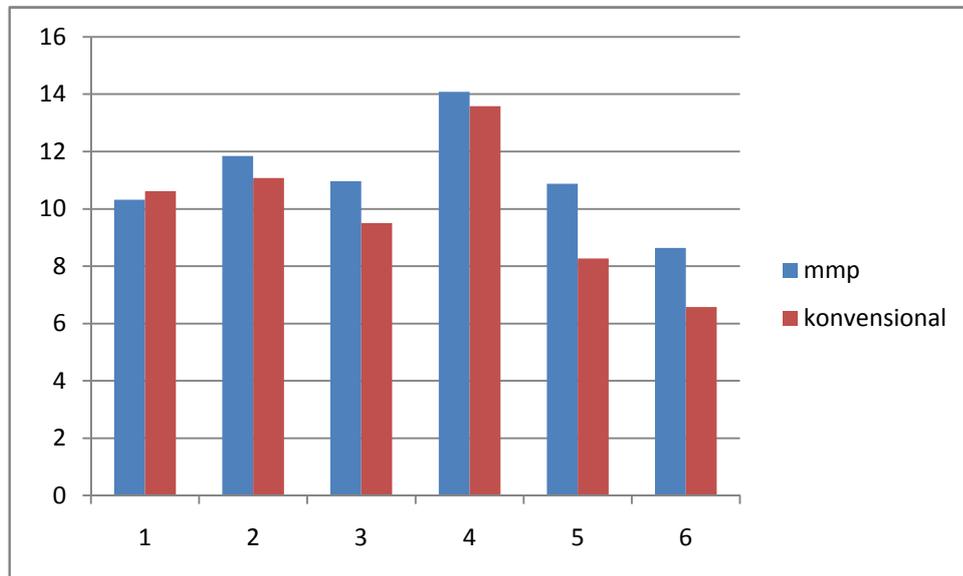
B₄ = Applying category

B₅ = Evaluating category

B₆ = Creating category

Picture 4.3

Average of student Achievement on Experiment Class and Control class Based on Bloom Taxonomy



1. The first hypothesis

From the results of two-way analysis of variance with unequal cells with a significance level of 5% was obtained $F_A = 11.766$ and $F_{table} = 3.84$. . Then the test is also obtained from $F_B = 23.813$ and $F_{table} = 2.21$. Due $F_A > F$ and $F_B > F$ then H_0A H_0B rejected, meaning that there are significant learning model uses Missouri Mathematics Project (MMP) and the conventional model of the learning outcomes of students in mathematics high School Teachers' Training College Veteran III Tambakromo.

2. The second hypothesis

From the results of two-way analysis of variance with unequal cells with a significance level of 5% was obtained $F_{AB} = 1.59$ and $F_{table} = 2.21$. Because $F_{AB} < F_{table}$ then H_0AB accepted, meaning that there is no interaction between learning models Missouri Mathematics Project with conventional models that were reviewed based on the dimensions of cognitive taxonomy bloom on high school students in the Teachers' Training College Veteran III Tambakromo.

4. CONCLUSION

Based on the result of analysis and discussion done in the previous chapter with 5% of significant level, it can be concluded that:

- 1) There is no influence of the use of Missouri Mathematics Project (MMP) model with $F_A = 11,766$ and influence of conventional model with $F_B = 23,213$ to student's mathematics achievement based on cognitive dimension bloom taxonomy in SMA IKIP Veteran III Tambakromo. From the result of multiple comparison test show that evaluation categories and create category on using Missouri Mathematics Project (MMP) model more better than using conventional model. They are known from the average, Missouri mathematics Project (MMP) model have the average which is obtained better than conventional model of cognitive dimension bloom taxonomy.
- 2) There is no interaction between the use of two learning model to student's mathematics achievement based on bloom taxonomy in SMA IKIP Veteran III Tambakromo with $F_{AB} = 1,59$.

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