

# The Effect of Learning Discipline on Mathematical Concept Mastering Vocational Middle School Students in Jakarta

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**Abstract:-** This study aims to determine the effect of learning discipline on the mastery of mathematical concepts. There are two variables in this study, namely learning discipline and mastery of mathematical concepts. The research method used is a survey. A sample of 82 students was selected from three schools, namely Vocational High Schools in Jakarta, Indonesia. Data was collected using questionnaires and test techniques. The results showed that there was a significant influence of learning discipline on the mastery of mathematical concepts. In accordance with the results of the study, it showed that student learning discipline had an influence on mastery of mathematical concepts. Thus, student learning discipline must be implemented consistently both at school and at home. This study provides input to the world of education that overall mastery of mathematical concepts in students requires consistent practice questions, to do practice questions requires a high learning discipline attitude. Disciplining children requires cooperation between teachers, parents, and the environment.

**Keywords:-** Learning Discipline; Concept Mastering; Mathematics; Vocational High School.

## I. INTRODUCTION

Mathematics is a means of communicating science about patterns that are useful for training logical, critical, creative, and innovative thinking. Therefore, almost all countries place Mathematics as one of the important subjects for the achievement of the progress of the country concerned. In addition, Mathematics subjects equip students with the ability to work together. These competencies are needed so that students can have the ability to obtain, manage, and utilize information to survive in conditions that are always changing, uncertain, and competitive. Mathematics Subject states that the Vocational Mathematics subject aims to make students have the ability, namely: (1) Understanding mathematical concepts, explaining the interrelationships between concepts and applying concepts or algorithms, in a flexible, accurate, efficient, and precise manner, in problem solving, (2) Using reasoning on patterns and properties, performing mathematical manipulations in making generalizations, compiling evidence, or explaining mathematical ideas and statements, (3) Solving problems which include the ability to understand problems, design mathematical models, complete models and interpret solutions obtained, (4) Communicating ideas with symbols,

tables, diagrams, or other media to clarify situations or problems, (5) Having an attitude of appreciating the usefulness of mathematics in life, namely having curiosity, attention, and interest in learning mathematics, as well as a tenacious and trusting attitude themselves in problem solving, and (6) Reasoning logically and critically and develop creative activities in solving problems and communicating ideas. In addition, it gives the ability to apply Mathematics in any skill program.

The goals that have been described above have so far been difficult to realize. This is reflected in the low student learning outcomes. The low mathematics learning outcomes of students are caused by many factors, including a curriculum that contains too many subjects, too much material, inappropriate learning media applied by teachers, and inaccurate evaluation system, student discipline in learning, basic mathematical abilities that are still lacking, weak, and lack of parental attention. The approach used by the teacher is still conventional, where students are less involved and tend to be passive. Even though the 2013 curriculum uses a scientific approach, what is happening in the field is still using conventional methods. Teachers in learning Mathematics put a lot of emphasis on memorizing formulas, and the use of formulas to solve problems does not apply basic mathematical concepts so that they are easy to memorize and easy to forget. This condition is still inversely proportional to the expectations listed in the curriculum. When viewed from the supporting facilities, the facilities provided by the school can be said to be quite adequate, the teachers are also quite competitive. However, to improve students' mastery of mathematical concepts, it is not enough just to pay attention to external factors, more, internal factors must also be considered. Internal factors can be said to be an encouragement that comes from the students themselves. Internal factors that influence students' mastery of mathematical concepts include talent, motivation, intelligence, interests as well as students' physical and psychological conditions. Meanwhile, external factors include educational facilities and infrastructure, curriculum, and environment. For now, the efforts taken are more on the external factors of students, there is still very little improvement in the internal aspects of students.

As described above, one of the internal factors that influence the mastery of mathematical concepts is student discipline. Discipline can shape a child's psyche to understand the rules so that he also understands when is the right time to

implement the rules, and when to put them aside. Marilyn E. Gootman, Ed. D, an education expert from the University of Georgia in Athens, America, in Ahmad, argues that discipline will help children to develop self-control, and help children recognize wrong behavior and then correct it. [1]

Learning discipline is very necessary for the realization of a good learning process. Discipline in learning will further hone students' skills and memory of the material that has been given because students learn according to their own awareness and students will always be motivated to always learn so that in the end students will find it easier to work on questions from the material provided.

Learning with directed discipline can avoid feeling lazy and create enthusiasm for students in learning, which in turn will be able to increase students' learning abilities. Discipline is the key to success and success. With discipline, a person becomes convinced that discipline will bring benefits as evidenced by his actions. After behaving disciplined, one will be able to feel that discipline is bitter but the fruit is sweet. Discipline provides great benefits to a person. At first, glance, when we hear the word discipline, we always think of efforts to insulate, guard and restrain. Even though this is not the case, discipline means training, educating, and regulating or living regularly. This means that the word discipline does not contain the meaning of isolation, but also training. For this reason, discipline is needed in an effort to improve an orderly life and improve learning outcomes because of its regulatory and educational nature. From most successful people, it seems that none of them are undisciplined, the discipline that is embedded in their every activity that brings success.

Good learning discipline is not innate but can be formed and instilled in students from as early as possible before students are at the level of formal education. The participation of parents is very supportive in the formation of good study habits because for the first time education was introduced by the closest community in the smallest scope, namely the family. Families should provide lessons to their family members about good habits and include the study habits of family members, especially children. Children should not be allowed to grow without strict supervision from parents because of the development of the era and advanced technology and many disturbances, especially those that make children lazy to learn. Technology in addition to having a positive impact also has a negative impact, the negative impact is more influential than the positive impact for children such as television, cellphones, and games.

Difficulties in learning Mathematics actually start from a lack of understanding and mastery of basic mathematical concepts, which results in students being less able to solve math problems. To instill an understanding of the concept requires a disciplined attitude in good learning.

The ability to master mathematical concepts is an assessment of the learning process activities on the learning outcomes achieved by students with certain criteria. This shows that Mathematics plays an important role in efforts to improve human resources. Mathematics learning is expected to end in

an ability to master the basic concepts of Mathematics in accordance with the material provided.

The fact shows that the low mathematics learning outcomes of SMK students are a challenge for the world of Mathematics education. Teachers, parents, and students can change it so that mastery of Mathematics concepts can increase. Parents should increase their attention to their children in order to have high learning discipline, for students themselves must have a high learning discipline attitude so that they are able to master mathematical concepts. This study aims to determine the direct influence of learning discipline on the mastery of mathematical concepts.

## II. LITERATURE REVIEW

### A. *Mathematical Concepts*

In mastering mathematical concepts, students must form concepts or structures through previous experience. The new concept or structure must be meaningful to students, meaning that the concept fits the students' abilities and is relevant to cognitive abilities. [2]

Cognitive ability mastery of concepts includes: [3]

#### ➤ *Knowledge*

Knowledge is a process to remember and recall information at a time if needed. Knowledge is classified into two kinds, namely: 1) Knowing something, in particular, a) Knowing the terminology. This ability relates to the ability to recognize or recall certain terms or concepts which are expressed in the form of symbols, either verbal or nonverbal. b) Knowing certain facts, This ability relates to the ability to recognize or recall dates, events, people, places, and others. 2) Knowledge of how to process or do something, a) Knowing the habits or ways of presenting ideas or experiences, b) Knowing the sequence or trend, namely the process, direction, and movement of a symptom or phenomenon at related times, c) Knowing the classification or categorization, namely knowing class, group, device or structure used in a particular field or process something, d) Knowing the criteria used to identify facts, principles, opinions or treatments e) Knowing the methodology, namely the set of methods used to search, find, or solve problems, f) Knowing universal and abstract things in a particular field, namely ideas, charts and patterns used to organize a phenomenon or thought g) Knowing principles and generalizations, h) Knowing theory and structure

#### ➤ *Comprehension The ability*

To understand can also be referred to as the term "understand". A student is said to have the ability to understand or understand if the student can explain a certain concept in his own words, can compare, can distinguish, and can contrast the concept with other concepts. The abilities included in the ability to understand are a) Translation, namely the ability to change certain symbols into other symbols without changing the meaning. For example, symbols in the form of words (verbal) are converted into pictures, charts, or graphs. b) Interpretation, namely the ability to explain the meaning contained in symbols, both verbal and nonverbal symbols. For example, the ability to explain certain concepts or principles

and theories. c) Extrapolation, namely the ability to see the trend or direction or continuation of a finding.

➤ *Application*

Application The ability to use certain concepts, principles, procedures, or theories. A person is said to master this ability if he can give examples, use, clarify, utilize, complete, and identify which ones are the same.

➤ *Analysis*

The analysis is the ability to describe a material (phenomenon or lesson material) into its elements, then relate the parts to the parts by how they are arranged and organized. According to Bloom, there are three types of analytical skills, namely elemental analysis, relationship analysis, and analysis of organized principles.

➤ *Synthesis*

The ability to collect and organize all elements or parts, so as to form a whole as a whole. In other words, an intellectual ability that combines all relevant elements to form a completely new pattern or structure.

➤ *Evaluations*

the ability to make decisions, express opinions, or give judgments based on both qualitative and quantitative criteria. Evaluation can be distinguished based on the justification criteria used, namely: 1) Justification based on internal criteria is carried out by paying attention to the consistency or accuracy of the logical arrangement of the elements in the object being observed so that a person can make a decision or give an assessment. 2) Justification based on external criteria is carried out based on criteria sourced outside the object being observed.

Thus, mastery of mathematical concepts is a product of a person's learning activities to understand and understand an object or objects through observation and one's experience in solving mathematical problems, so that mastery of this concept becomes a concept that is not easily lost. A student can be said to master a concept if a) Knowing the characteristics of a concept, b) Knowing some examples and not examples of the concept, c) Knowing a number of its properties and essence, d) Can use the relationship between concepts, e) Can recognize the relationship between concepts, f) Can recognize the concept again in various situations g) Can use concepts to solve mathematical problems, h) Specialized in geometry, can recognize shapes, can demonstrate, and recognize equations.

Students also cannot solve the problems above if they have not mastered the concept of a trapezoidal shape, students must have mastered the concepts of perimeter or area of a flat shape. This will have an impact on the next process, namely, students can process facts or are skilled at using a mathematical concept in solving a mathematical problem as a benchmark in mastering the concept. If the above is already owned by the student, then the student will easily remember and re-express what he has learned because a concept has been embedded in his memory and must be maintained by using the concept regularly.

Mastery of concepts is the ability of students to understand the meaning scientifically both in theory and in its application in everyday life.[4] While the definition of mastery of concepts according to Bloom is the ability to capture meanings such as being able to express a material that is presented in a form that is more understandable, able to provide interpretation, and be able to apply it.

Based on the description above, it can be concluded that mastery of concepts must be based on understanding concepts. If these two things can be understood and mastered then the material can be easily remembered by students and if one day the teacher is asked about the concepts he has learned, the students will be easy to express them. So that students can remember a mathematical concept for a long period of time, students must acquire the concept by using it in everyday life which is formulated with mathematics learning, of course with the help of the teacher as a facilitator.

### *B. Learning Discipline*

Elizabeth B. Hurlock explains discipline as a process of training or learning that is related to growth and development. A person is said to have succeeded in learning if he can follow automatically the figures who have taught something, namely parents or teachers.[5] Discipline education is a guided process that aims to instill certain behavior patterns, certain habits, or form humans with certain characteristics, especially to improve mental and moral qualities.

The definition of the discipline in contains 3 things, namely: 1) It implies that there are forms of rules that are clearly written in a school or military. These rules are called rules. 2) Contain the nature of being obedient or obedient to the rules (rules). 3) Discipline means a field of study that has certain objects, systems, and methods. [6]

Discipline is a feeling of being obedient and obedient to the values that are believed to include certain jobs that are their responsibilities. Discipline is an attempt to instill values or coercion so that the subject has the ability to obey a rule. Discipline can be a term for punishment where this can be done to oneself or to others. Elements of Discipline: a) Following and complying with applicable regulations, values, and laws. b) The following and obedience mainly arise because of the self-awareness that it is useful for his good and success. Can also arise because of fear, pressure, coercion, and encouragement from outside him. c) As an educational tool to influence, change, foster, and shape behavior in accordance with the values determined or taught. d) Penalties are given for those who violate the applicable provisions, in the context of educating, training, controlling, and improving behavior. e) The applicable regulations as guidelines and measures of behavior.

**III. METHOD**

This research was conducted at the Jakarta Vocational High School. The number of Jakarta Vocational High Schools in the Central Jakarta Administrative City area is fourteen schools. The population in this study were students of class XI Jakarta State Vocational High School in the Central Jakarta Administrative City area. In determining the number of samples, researchers used the Taro Yamane formula with a population of 480, so the total sample was 82 people.[7] Data analysis used simple linear regression.

**IV. RESULT AND DISCUSSION**

Data on student learning discipline in mathematics subjects was obtained from respondents consisting of 30 statements answered by 82 respondents. Based on calculations with the help of the SPSS program, the following results are obtained:

Table 1. Learning Discipline

Statistics	
Mean	114.99
Median	115.00
Mode	112 <sup>a</sup>
Std. Deviation	10.935
Variance	119.568
Range	52
Minimum	89
Maximum	141
Sum	9429

From the description of the data above, it can be seen that the mean is 114.99, the median is 115.00, the mode is 112, and the standard deviation is 10.935. By looking at the mean value which is then categorized on a five scale, namely:  
 131.393 < mean: very high category  
 120.458 < mean 131.393: high category  
 109,523 < mean 120.458: medium category  
 98,588 < mean 109.523: low category 98,588 :

average category very low by looking at the mean value of 114.99 which is in the range of values of 109.523 < mean 120.458, then the learning discipline data in Mathematics is in the medium category.

Data on Mastery of Mathematical Concepts was obtained from respondents consisting of 30 statement items answered by 82 respondents. Based on calculations with the help of the SPSS program, the following data descriptions were obtained:

Table 2. Mathematical Concepts

Statistics	
Mean	61.54
Median	67.00
Mode	60
Std. Deviation	22,259
Variance	495,462
Skewness	-,416
Std. Error of Skewness	,266
Kurtosis	-1,094
Std. Error of Kurtosis	,526
Range	76
Minimum	17
Maximum	93
Sum	5046

From the description of the data above, it can be seen that the mean value is 61.54, the median is 67.00, the mode is 60.00 and the standard deviation is 22.259. By looking at the average value which is then categorized on a five scale, namely:

- 94,929 < mean: very good category
- 72,670 < mean 94,929: good category
- 50,411 < mean 72,670: medium category
- 28,152 < mean 50,411: poor category
- 28,152: category very poor

by looking at the mean value, which is 61.54 in the range of values of 50.411 < mean 72.670, then the data on mastery of mathematical concepts is in the medium category.

Table 3. Summary of Anava Simple Linear Regression

Source Variant	df	Sum of Squares	Mean Sum Squares	F count	F table
Total	82	350646	-	-	-
Regression(a)	1	310513.61	310513.61	19.54	6.96
Regression(b/ a)	1	7877.36	7877.36		
Residue	80	32255.03	403.19		

It turns out that  $F_{\text{arithmetical}} > F_{\text{table}}$  ( $19.54 > 6.96$ ) so that  $H_0$  is rejected, and it is concluded that there is a significant effect of student learning discipline on mastery of mathematical concepts.

Based on the path analysis, it is known that the path coefficient of the student discipline variable on the mastery of mathematical concepts ( $r_{13}$ ) is 0.443. Which means that each addition of one unit or one level of learning discipline will have an impact on increasing mastery of mathematical concepts by 0.443 units.

Discipline is an action that shows orderly behavior and obeys various provisions and regulations.[8] Learning discipline has a big influence on learning outcomes, in the same situation students who have a high level of learning discipline will be more successful than those who have lower learning discipline, especially mastery of mathematical concepts.

Mastery of concepts as the ability of students to understand the meaning scientifically both in theory and its application in everyday life.[4] From the data above, it can be said that if the mastery of mathematical concepts is to be improved optimally, it is necessary to increase high learning discipline. Discipline enforcement in schools must be supported by parents at home and the environment will have an influence on students' mastery of mathematical concepts. There is a significant direct influence of student learning discipline on the mastery of mathematical concepts. The research findings show that student learning discipline on the mastery of mathematical concepts shows a significant correlation and has a strong direct influence on mastery of mathematical concepts.

## V. CONCLUSION

Based on the results of research and discussion, the results of the study showed that the discipline of learning has an influence on the mastery of the mathematical concept of State Vocational High School students in Jakarta.

## REFERENCES

- [1]. I. I. N. Ahmad, *Membentuk dan Meningkatkan Disiplin Anak. Sejak Din.* 2009.
- [2]. H. Hudojo, *Pengembangan Kurikulum dan Pembelajaran Matematika.* Malang: Universitas Negeri Malang Press, 2005.
- [3]. W. Gulo, *Metodologi Penelitian.* Yogyakarta: Grasindo, 2004.
- [4]. R. Dahar, *Teori-Teori Belajar & Pembelajaran.* Jakarta: Erlangga, 2006.
- [5]. S. D. Gunarsa, *Psikologi Anak: Psikologi Perkembangan Anak dan Remaja.* Jakarta: PT BPK Gunung Muli, 2008.
- [6]. D. P. Nasional, *Kamus Besar Bahasa Indonesia.* Jakarta: Balai Pustaka, 2003.
- [7]. T. Yamane, *Statistics: an introduction analysis.* New York: Harper and Row, 1973.
- [8]. M. Mustari, *Nilai Karakter Refleksi untuk Pendidikan.* Jakarta: PT. RajaGrafindo Persada, 2014.