

# The Influences of Time Management, Learning Facilities, and Divergent Thinking Ability on Students' Mathematics Learning Achievement at SMKN 4 Gowa

\*Arfiani Maharani HR<sup>1</sup>

<sup>1</sup> Postgraduate Program Universitas Negeri Makassar, Makassar, Indonesia.

\*Corresponding author. Email: [arfianimaharani8@gmail.com](mailto:arfianimaharani8@gmail.com)

## ABSTRACT

This research is ex-post facto research that aims to understand the differences between time management, learning facilities, and divergent thinking ability on students' mathematics learning achievement at SMK Negeri 4 Gowa Grade XI. The population in this study amounted to twenty-two classes consisting of seven majors, while the sample was one representative class from each department in class XI of SMK Negeri 4 Gowa. The sampling technique uses random cluster sampling. Data collection was carried out using the time management questionnaire, learning facility questionnaire, divergent thinking ability test, and mathematics learning achievement. The data is analyzed descriptively and inferentially. Descriptive research results obtained (1) Mathematical learning achievement depend on the medium category (2) Time management according to the high category (3) Learning facilities according to the high category (4) Divergent thinking skills in the low category. The results of the inferential analysis show that time management, learning facilities, and divergent thinking ability prove positively on mathematics learning achievement.

**Keywords:** Learning Facilities, Divergent Thinking Ability, Time Management, Mathematics Learning Achievement.

## 1. INTRODUCTION

Learning is the most vital activity in the educational process. Without learning, educational activities never exist. Learning can occur in formal, non-formal, and informal environments. Learning can be understood as trying or practicing to get intelligence [1]. In its implementation, learning is an individual activity to acquire knowledge, behavior, and skills by processing learning materials. Mathematics is one of the subjects that occupy an essential role in the world of education. Its position supports this as part of one of the subjects tested on the national exam at every level of education. But there are still many other students who think that mathematics is difficult, and the effect is students not doing well in mathematics. There was a decrease in the average score of national examinations (UN) of mathematics subjects at the three school levels (junior high, high school, and vocational school) [2].

Difficulties in learning should get serious attention from various parties, especially for educators,

considering that learning is one of the important elements in learning. Besides that, learning achievement is also important. Learning achievement is the result students had achieved in learning activities at school [3]. The factors that contribute to students learning achievement consist of internal and external factors [4]. The Internal factors include time management and students' divergent thinking ability, while external factors are learning facilities.

Time management is one of the internal factors that are thought to affect learning achievement. Time management is a problem for most children and many adults [5]. Another internal factor is divergent thinking ability. In mathematics learning, divergent thinking ability is important because students can view a subject in mathematics learning from an unusual perspective. Students have other ideas than their teacher thinks. Moreover, the external factor that is thought to affect learning achievement is learning facilities. Good conditions may influence students to perform well in the learning process.

Several relevant studies [6-8]]. This research was conducted to know the description and influence of time management, learning facilities, and divergent thinking ability on students' mathematics learning achievement in one of the Vocational High Schools in Gowa, South Sulawesi.

## **2. LITERATURE REVIEW**

### **2.1. Mathematics Learning Achievement**

Students' intellectual abilities determine the success of students in obtaining achievements. To assess student success, it is necessary to do the evaluation; the aim is to find out students' achievements after learning activities [9]. Winkel said that learning achievement is evidence of learning success or a student's ability to carry out learning activities according to the weight achieved [10].

The factors that contribute to students learning achievement consist of internal factors, external factors, and learning approaches. Internal factors include physiological factors and psychological factors.

(intelligence, attention, interest, motivation, talent). The external factors include social factors and non-social factors. Meanwhile, the learning approach factor is the type of student learning effort which consists of the strategies and methods used by students in participating in learning activities.

### **2.2. Time Management**

Management, in general, can be defined as resources effectively to achieve goals. Then, time can be interpreted as a whole series of ongoing processes, actions, or circumstances [11]. Time management is an act of organizing, scheduling, and allocating everyone's time to produce more effective and productive work [12]. Time management is an activity to manage time as well as possible, to be able to achieve one's life goals [13]. Aspects of time management are time planning priorities made in the form of a time quadrant. The time quadrant has 2 main elements: "important" and "urgent" [14]. Important is an element that includes essential things for students, meaningful activities for students who have contributed to achieving student goals that are good learning achievement. Urgency is an element that provides for pressing things on students, which students demand to do. Time management is needed so that each individual can carry out their activities effectively and efficiently.

### **2.3. Divergent Thinking Ability**

Divergent thinking is the ability based on the data or information provided to find many possible answers to a problem and emphasize the diversity of the answers given [15]. Divergent thinking refers to patterns of thinking that go in various directions marked by fluency, flexibility, and authenticity [16]. Divergent thinking patterns are always on the move, pointing outwards, looking for something interesting along the way. They prefer the process over the result. Divergent thinking abilities are individual skills, in this case, students, to generate new ideas, produce something creative and solve problems when faced with problems related to their daily lives. The creative thinking process can be seen through fluency, flexibility, originality, and the ability to elaborate by developing, enriching, detailing an idea.

### **2.4. Learning Facilities**

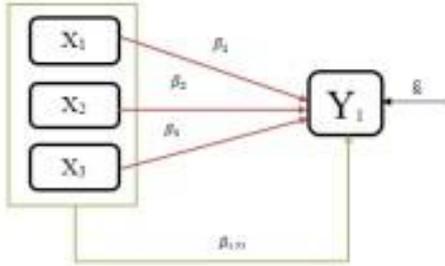
Facilities are tools or everything used to facilitate a business or work. Facilities could be interpreted as anything that can facilitate and expedite the implementation of a business [17]. Facilities in schools have a very important role in helping students understand the subject matter. Facilities are supporting facilities for students' learning process [18]. The more complete facilities students have, the higher the probability of the student's success. Therefore, the school should not ignore the role of learning facilities in schools which are very important for students.

There are three aspects of learning facilities, namely learning resources, learning tools, and learning support. Learning resources are all sources in the form of data, people, and certain forms that students can use in learning, either separately or in combination, making it easier for students to achieve learning goals or achieve certain competencies. Meanwhile, learning tools help students learn to increase efficiency in learning while teaching media can be interpreted as everything that can be used to channel messages, stimulate students' thoughts, feelings, attention, and willingness, and encourage the learning process.

## **3. METHOD**

The research is ex post facto research type. The study was conducted at one of the vocational schools in Gowa, South Sulawesi. The population in this research was grade XI vocational school students consisting of 22 classes with 7 majors. Meanwhile, the sample selection technique uses random sampling clusters. Thus, the sample in this study is one class

from each major in the vocational school. The research design is as follows.



**FIGURE 1.** Design of Relationships Between Research Variables Y

The research design in Figure 1 is to see if there is an effect of time management variables (X1), learning facilities (X2), and divergent thinking skills (X3) on learning mathematics achievement (Y). The analytical technique used is descriptive statistical analysis and inferential statistical analysis.

Before the data is analyzed, the ordinal data obtained from the questionnaire results are transformed into interval data. Transform ordinal data into interval data to qualify for parametric analysis. Then the data must be transformed into interval data. Weighting for each variable uses the *Method of Successive Interval (MSI)* program. Transformed data using weights in each category.

The next step is to perform a descriptive statistical analysis test. Descriptive statistical analysis is the first step in performing analytical techniques. This analysis will show a frequency distribution table, mean, variance, standard deviation, and percentage calculation. The purpose of this analysis is to describe each research variable before proceeding to the next analysis.

The following analysis is inferential statistical analysis. This analysis is used to test the research hypothesis. The analysis model in this study is a multiple regression model at the 95% confidence level ( $\alpha = 0.05$ ). This analysis was tested through normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test. The fulfillment of the test will determine the continuation of the hypothesis test.

The hypotheses in this study are:

- a. There is a positive and significant relationship between time management, learning facilities, and divergent thinking ability with mathematics learning achievement of grade XI at SMKN 4 Gowa.

- b. There is a positive and significant relationship between time management with mathematics learning achievement of grade XI at SMKN 4 Gowa.
- c. There is a positive and significant relationship between learning facilities with students' mathematics learning achievement of grade XI at SMKN 4 Gowa.
- d. A positive and significant relationship exists between divergent thinking ability and mathematics learning achievement of grade XI at SMKN 4 Gowa.

## 4. RESULTS AND DISCUSSION

### 4.1. Descriptive Statistical Analysis

The results of descriptive statistical analysis in this study are:

**TABLE 1.** Mathematics Learning Achievement Score

Value Interval	Category	Frequency	Percentage (%)
Score < 40	Very Low	7	3,89
40 score < 55	Low	51	28.33
55 score < 70	Medium	82	45.56
70 score < 85	High	40	22.22
85 score 100	Very High	0	0
Sum		180	100

Results Table 1 shows the mathematics learning achievement of grade XI students at SMK Negeri 4 Gowa is in the medium category with a percentage of 45.56% with a frequency of 82 students out of 180 students.

**TABLE 2.** Time Management Score Frequency Distribution

Range of Score	Category	Frequency	Percentage (%)
$23,00 \leq \text{score} < 33,69$	Very Low	0	0
$33,69 \leq \text{score} < 55,63$	Low	54	30
$55,63 \leq \text{score} < 79,82$	High	124	68.89
$79,82 \leq \text{score} < 92,76$	Very High	2	1.11
Sum		180	100

In Table 2, it can be seen that general time management of grade XI SMK Negeri 4 Gowa is in the high category with a percentage of 68.89% with a frequency of 124 students out of 180 students.

**TABLE 3.** Learning Facility Score Frequency Distribution

Range of Score	Category	Frequency	Percentage (%)
17,00 ≤ score < 24,74	Very Low	0	0
24,74 ≤ score < 40,99	Low	42	23,33
40,99 ≤ score < 59,11	High	118	65.56
59,11 ≤ score < 68,73	Very High	20	11.11
	Sum	180	100

Table 3 shows the category of learning facilities scores of grade XI at SMK Negeri 4 Gowa are in the high category with a percentage of 65.56% with a frequency of 118 students out of 180 students.

**TABLE 4.** Frequency Distribution of Divergent Thinking Ability Score

Value Interval	Category	Frequency	Percentage (%)
35.71 score < 46.71	Very Low	26	14.44
46.71 score < 57.71	Low	51	28.33
57.71 score < 68.71	High	59	32.78
68.71 score < 79.71	Very High	30	16.67
	Sum	180	100

Table 4 shows the categories of divergent thinking ability scores of grade XI at SMK Negeri 4 Gowa is in the medium category with a percentage of 32.78% with a frequency of 59 students out of 180 students.

**4.2. Inferential Statistical Analysis**

The results of inferential analysis on each hypothesis in this study are:

**TABLE 5.** Prerequisite Test Results

Prerequisite Test	Time Management	Learning Facilities	Divergent Thinking Ability
Multicollinearity Test			
1. Tolerance	0,706	0,676	0,900
2. VIF	1,416	1,479	1,111
Heteroscedasticity Test			
1. Sig Value.	0,126	0,215	0,085

Autocorrelation Test	dW = 1,981
----------------------	------------

In Table 5, the multicollinearity test values are obtained for each variable. The regression model is free from multicollinearity symptoms (no correlation between independent variables) if the value is *Tolerance* more than 0.10 or the *Variance Inflation Factor (VIF) value* is less than 10.00. Thus, it can be concluded that from each variable, there is no multicollinearity.

The following requirement is the heteroscedasticity test. In table 5, it shows that the correlation value of the time management variables with the unstandardized residual (0.126) for mathematics learning achievement, the learning facilities variable with the unstandardized residual (0.215) for mathematics learning achievement, and variable correlation values of divergent thinking ability with unstandardized residual (0.085) for mathematics learning achievement, so it can be concluded that there is no heteroscedasticity symptom found in the regression model.

Then, the autocorrelation test must qualify *Durbin Watson*. *Durbin Watson's* requirement is  $du < dw < 4du$ . In table 5, there is a dW value for mathematics learning achievement, which is 1,981 with a value of n=180. Once accumulated based on *Durbin Watson's* test conditions, each category meets  $du < dw < 4du$ . This indicates that no autocorrelation symptoms occur.

In table 5, it can be seen that the dW value for cognitive aspects of mathematics learning achievement is 1.981 with a value of n = 180. For mathematics learning achievement, the skill aspect is 1,964 with a value of n=180. After being accumulated based on the conditional test *Durbin Watson*, each category meets  $du < dw < 4du$ . This shows that there is no autocorrelation symptom.

**4.3. Research Hypothesis Testing**

**TABLE 6.** Summary of Hypothesis 1 Test Results (Anova<sup>a</sup>)

Test F	Sig.
34,185	0,000

In Table 6, it can be seen that the calculated F value is 34.185, with a significance value obtained is 0.000. F table of 3.05. So, F count (34.185) > F table (3.05) and a significance value of 0.000 < 0.05. Thus, there is a relationship between time management, learning facilities, and divergent thinking abilities with students' mathematics learning achievement.

**TABLE 7.** Summary of Hypothetical Test Results of Mathematics Learning Achievement

Category	T value	Sig.
Time Management	2,437	0,016
Learning Facilities	4,905	0,000
Divergent Thinking Ability	4,078	0,000

In Table 7, the significance value for the X1 variable is 0.016. Because the hypothesis in this study is to see a positive effect, the significant value is divided in two so that a significance value of 0.008 <0.05 is obtained. Thus time management has a positive relationship with mathematics learning achievement.

In addition, the significance value for the variable X2 is 0.000. Because the hypothesis in this study is to see a positive effect, the significant value is divided in two so that a significance value of 0.000 <0.05 is obtained, thus learning facilities have a positive relationship with mathematics learning achievement.

Table 7 also shows the significance value for the variable X3 is 0.000. Because the hypothesis in this study is to see a positive effect, the significant value is divided into two. A significance value of 0.000 <0.05 is obtained, with divergent thinking ability having a positive relationship with mathematics learning achievement.

## 5. CONCLUSION

The purpose of this study was to determine the effect of time management, learning facilities, and divergent thinking ability on the mathematics learning achievement of class XI SMK students at a school in Gowa. The conclusions obtained are:

1. The results of the descriptive analysis show that most of the students of class XI SMK have mathematics learning achievement in the medium category, time management in the high category, learning facilities are in the high category and divergent thinking abilities are in the medium category.
2. There is a positive and significant relationship between time management, learning facilities, and divergent thinking ability with mathematics learning achievement of grade XI at SMKN 4 Gowa.
3. There is a positive and significant relationship between time management with mathematics learning achievement of grade XI at SMKN 4 Gowa.

4. There is a positive and significant relationship between learning facilities with mathematics learning achievement of grade XI at SMKN 4 Gowa.
5. A positive and significant relationship exists between divergent thinking ability and mathematics learning achievement of grade XI at SMKN 4 Gowa.

## REFERENCES

- [1] Balqis, P., Usman, N & Ibrahim, S. (2014). Teacher's Pedagogic Competence in Improving Student Learning Motivation at SMPN 3 Wants Jaya, Aceh Besar District. *Journal of Educational Administration*, 2(1). [<http://jurnal.unsyiah.ac.id/JAP/article/view/2497> accessed on November 19, 2019].
- [2] Sumaryanta., Priatna, N. & Sugiman. (2019). Pemetaan Hasil Ujian Nasional Matematika. *Indonesian Digital Journal of Mathematics and Education*, 6(1). [<http://p4tkmatematika.kemendikbud.go.id/journals/index.php/idealmathedu/article/view/31> diakses pada 19 November 2019].
- [3] Hidayati., Alexon., & Turdjai. (2017). Application of a Structure Analysis Program-Based Process Skills Approach to Increase Accuracy and Student Achievement (Studies on Statics and Tension Subjects in Class X Building Engineering at SMKN 1 Curup). *Scientific Journal of Educational Technology*, 7 (2). 1- 11. [<http://ejournal.unib.ac.id/index.php/diadik/article/download/3678/1923> accessed on November 20, 2019].
- [4] Khotimah, S. (2006). *Efforts to Improve Student Achievement in History PKPS/IPS Lessons by using Picture Media on the Subject of Historical Building Heritage in Grade IV Students of SD Gisikdrone 04, West Semarang District, Semarang City, 2005/2006 Academic Year* (Thesis). Semarang State University, Semarang.
- [5] Juliasari, N & Kusmanto, B. (2016). The Relationship between Study Time Management, Learning Motivation, and Learning Facilities with Mathematics Learning Achievement of Class VIII Junior High School Students in Danurejan District, Yogyakarta. *Journal of Mathematics Education*, 4(3). 405-412. [<http://jurnal.ustjogja.ac.id/index.php/union/article>

- [le/viewFile/435/pdf](#) accessed on February 20, 2019].
- [6] Rahmawati, W. (2017). *Pengaruh Manajemen Waktu Belajar dan Motivasi Belajar Siswa terhadap Prestasi Belajar Siswa Kelas V di SDN Tamanagung 2 Muntilan Magelang Jawa Tengah Semester II Tahun Ajaran 2016/2017* (Skripsi). Universitas Islam Negeri Sunan Kalijaga Yogyakarta, Yogyakarta.
- [7] Agustini, BN (2016). *The Influence of Academic Potential, Divergent Thinking Ability, and Learning Independence on Mathematics Learning Achievement of Class IX Students of SMP Negeri 2 Sengkang*(Thesis). Makassar State University, Makassar.
- [8] Jannah, MZ. (2017). *The Influence of Learning Facilities and Learning Motivation on Learning Achievement of Class V Students in Mathematics Subjects at MI Bustanul Ulum Brudu Sumobito Jombang* (Thesis). Maulana Malik Ibrahim State Islamic University Malang, Malang.
- [9] Perbangsa, Wenny, W. A & Haq, CN (2014). Differences in Students' Mathematics Learning Achievement Between Those Who Get Learning Models Guided Note Taking and Team Accelerated Instruction. *Journal of Mathematics Education*, 3(3).  
[<http://media.neliti.com/media/publications/226704-beda-prestasi-learning-mathematics-si-4f4e1672.pdf> accessed on February 20, 2019].
- [10] Hamdu, G & Agustina, L. (2011). The Influence of Student Learning Motivation on Science Learning Achievement in Elementary Schools. *Journal of Educational Research*, 12(1).  
[[http://jurnal.upi.edu/file/8-Ghullam\\_Hamdu.pdf](http://jurnal.upi.edu/file/8-Ghullam_Hamdu.pdf) accessed on January 18, 2019].
- [11] KBBI, (2016). Big Indonesian Dictionary (KBBI). [Online] Available at : <http://kbbi.web.id/center>, [Accessed January 18, 2016].
- [12] Gea, AA (2014). Time Management: Using Time Effectively and Efficiently. *Journal of HUMANIORA*, 5(2). 777-785.  
[<http://journal.binus.ac.id/index.php/Humanora/article/download/3133/2519> accessed on January 18, 2019].
- [13] Rivandi, J. (2017). *Hubungan antara Manajemen Waktu dengan Self-Directed Learning Readiness pada Mahasiswa Tahun Kedua Fakultas Kedokteran Lampung* (Skripsi). Universitas Lampung, Bandar Lampung.
- [14] Hasanah, AR (2017). *The Effect of Time Management and the Role of Parents on Mathematics Learning Outcomes of Class VIII SMPN 1 Sungguminasa*. (Thesis). Makassar State University, Makassar.
- [15] Nirwana, SRA., Tiro, MA, & Sanusi, W. (2018). The Influence of Divergent Thinking Ability and Self-Efficacy on Mathematics Learning Achievement through Independent Learning of Eighth Grade Students of State Junior High School in North Galesong, Takalar Regency. *Proceedings of the 2018 Variance National Seminar*: 140-161. Makassar: Makassar State University.
- [16] Faizah, U. (2018). *Profile of Students' Divergent Thinking Ability in Solving Open-Ended Problems* (Thesis). Sunan Ampel State Islamic University Surabaya, Surabaya.
- [17] Novitasari, E. (2013). *The Influence of Learning Discipline and Learning Facilities on Economic Learning Achievement in Class XI Students of SMA Negeri 8 Surakarta in 2012/2013* (Thesis). Muhammadiyah University of Surakarta, Surakarta.
- [18] Ambarsari, I. (2013). *The Effect of Completeness of Learning Facilities and Learning Independence on Economic Learning Achievement in Class X Students of SMA Negeri 2 Sukoharjo in 2012/2013* (Thesis). Muhammadiyah University of Surakarta, Surakarta.