Motivation, Self-Regulated Learning, and Their Effects on Learning Outcomes of Derivative Materials During the Covid-19 Pandemic

Analisa Fitria 1 \*, Baiti Najihah 2, Muhammad Amin Paris 3 , Muh. Fajaruddin Atsnan 4, Maisea Ledua Nareki 5

1,2,3,4 Department of Mathematics Education, Universitas Islam Negeri Banjarmasin

Jl. Ahmad Yani Km 4,5 Banjarmasin, Kalimantan Selatan, Indonesia 70235

5 Mathematics Education and Physics, Gospel High School, Dhanji Street, Samabula, Suva, Fuji

E-mail: [analisafitria@uin-antasari.ac.id](mailto:analisafitria@uin-antasari.ac.id)

\* Corresponding Author

|  |  |
| --- | --- |
| ARTICLE INFO | ABSTRACT |
| Article history  *Received:*  *Revised:*  *Accepted:*  Keywords  Motivasi belajar, kemandirian belajar, hasil belajar, pandemi Covid-19 | Tujuan penelitian ini adalah untuk mengetahui pengaruh motivasi dan kemandirian belajar terhadap hasil belajar pada materi turunan fungsi trigonometri. Penelitian ini adalah penelitian lapangan (*field research)* dengan desain penelitian *Ex Post Facto* dan pendekatan kuantitatif, yang dilakukan pada masa Pandemi Covid-19. Populasi dalam penelitian ini adalah seluruh siswa kelas XII. Adapun sampel dalam penelitian ini adalah kelas XII IPA 1 dengan teknik pengambilan *purposive sampling.* Teknik pengumpulan data dalam penelitian ini adalah angket, tes, dokumentasi dan wawancara. Teknik analisis data dalam penelitian ini statistik deskriptif dan inferensial yang terdiri dari uji normalitas, uji linearitas, uji multikolinearitas, uji heteroskedasitas, dan uji regresi berganda. Hasil penelitian menunjukkan bahwa terdapat pengaruh motivasi dan kemandirian belajar selama pandemi Covid-19 terhadap hasil belajar siswa kelas XII pada materi turunan fungsi trigonometri di MAN 2 Banjar sebesar 90,9%. Hal ini didasarkan pada hasil uji F (Fhitung = 104,948 > Ftabel = 3,47) pada taraf signifikansi 5% dengan model regresi berganda |
| The study aims at identifying the influence of learning motivation and self-regulated learning on learning results of “Derivative” learning materials in Trigonometry Functions. The study is a field research using Ex-Post Facto design and quantitative approach during the Covid-19 Pandemic. Then, in conducting the study, the total population was all students from Grade XII while the samples in the study were the students from Grade XII Natural Science 1. These samples were selected by using the purposive sampling technique and all of the data necessary for the study were gathered through questionnaire distribution, test, documentation, and interview. After the data had been gathered, the data were analysed using the descriptive statistics and the inferential statistics consisting of normality test, linearity test, multicollinearity test, heteroscedasticity test, and multiple linear regression. The results of the study show that the influence of learning motivation and self-regulated learning toward learning results during Covid-19 Pandemics among Grade XII students on “Derivative” learning materials in Trigonometry Functions has been 90.90%. These results are based on the results of F-test on rate of significance 5% with multiple linear regression model .  [https://licensebuttons.net/l/by-sa/3.0/88x31.png](http://creativecommons.org/licenses/by-sa/4.0/)This is an open access article under the [CC–BY-SA](http://creativecommons.org/licenses/by-sa/4.0/) license. |

How to Cite: Pertama, P., Kedua, P., Ketiga, P (2019). Petunjuk penulisan naskah Jurnal Riset Pendidikan Matematika (versi template 2019). Jurnal Riset Pendidikan Matematika, 7(1) 1-3. doi:<https://doi.org/10.21831/jrpm.v7i1.000000>

INTRODUCTION

Learning motivation and self-regulated learning becomes two of many aspects that determine students’ learning results. Both aspects indeed influence their learning results in every learning process. Learning and motivation are two important things in a learning process (Elliott, 2000, p.332). Learning motivation is an important part that should be developed in every learning process that has been conducted (Nuriyatin & Hartono, 2016, p.209). Learning motivation is a psychic condition which encourages students to perform activities for attaining an objective namely good learning results (Fane & Sugito, 2019, p.55). Through the existence of learning motivation, students are expected to be more active in attaining the expected learning results (Kurniawan & Wustqa, 2014, p.179). Motivation is indeed one of the internal aspects that influence the achievement or the learning results of the students (Fane & Sugito, 2019, p.55). At the same time, learning motivation is also one of the factors that determine the success of the students (Warmi, Adirakasiwi & Santoso, 2020, p.198).

Similar situation also applies to self-regulated learning. If a student has high sense of self-regulated learning, then the student will develop sense of curiosity, will take active participation in learning process, will be able to think actively, will be able to think creatively, and will be able solve his or her own roblem (Azka & Santoso, 2015, p.80). Just like learning motivation, when an individual is able to manage the self-regulated learning in each learning process, including the one in Mathematics, then the student will develop a positive attitude for attaining the learning success (Jatisunda, Nahdi & Suciawati, 2020, pp.83-84). Thereby, self-regulated learning become one of the important aspects in learning process since it is able to impact the students’ success in learning process (Zimmerman & Schunk, 2011).

Mathematics is one of the domains in science that has significant role in both the school and the daily life (Gazali & Atsnan, 2017, p.124). Due to its significant role, Mathematics has been considered as a branch of science that pays attention to the importance of balance. The intended balance is the importance of paying attention to the learning results that represent the cognitive aspects and also the attitudes that represent the affective aspects. In the learning process of Mathematics, there are many factors that influence such balance, including the students’ personality (Purwanto et al., 2020, p.188). The students’ success in learning Mathematics depends on their attitudes (Purwanto et al., 2020, p.2). When a student has positive attitude in the form of high motivation, then the student will be encouraged to gain better learning results of Mathematics (Rivai & Murni, 2016, p.19). Indeed, learning motivation is in line with learning results of the students.

As having been explained previously, in addition to learning motivation there is another aspect that should be given attention namely self-regulated learning (Qohar & Sumarmo, 2013, p.61). In self-regulated learning, at least there are three characteristics namely planning learning independently, implementing learning independently, and evaluating learning results independently (Zimmerman, 2001). In the context of Mathematics learning process, students are expected to be active and independent during the learning process so that they will eventually be able to solve the mathematical test items that the teacher has assigned (Kurniyawati, Mahmudi & Wahyuningrum, 2019, p.120). Students who have the attitude of being independent within the learning process will not depend on the assistance by the teachers throughout the learning process.

When Covid-19 pandemics have overwhelmed the globe, including Indonesia, most of the activities in education, including study and learning process, should be done online. As a consequence, many students benefit numerous platforms of technology for learning from home (Wijaya, Ying & Suan, 2020, p.726). Ironically, as the students learn from home, they should deal with so many temptations that might make them lazy, whereas it is in this occasion that students should have learning motivation and self-regulated learning due to the minimum or the limited interaction between the teachers and the students during the online learning process especially with regards to Mathematics (Lestari, Aisah & Nurafifah, 2020, p.2; Ambiyar, Aziz & Melisa, 2020, p.1246). This situation becomes more complex since Mathematics has been one of the most difficult lesson to understand through the online learning process. The reason is that many teachers of Mathematics have low adaptive capacity; in other words, these teachers are not ready to teach Mathematics online (Atmojo, Muhtarom & Lukitoaji, 2020, p.513). In normal situation, the presence of learning motivation and self-regulated learning is believed to influence the students’ learning results in Mathematics. So, with regards to the statement, the question is: Do the two aspects also influence the learning results of Mathematics among the students during Covid-19 Pandemics? In addition, how are the students’ learning motivation and self-regulated learning during Covid-19 Pandemics? Through the thorough discussion, the present study shall strive to solve the two problem formulations.

METHOD

The researcher implemented the Ex-Post Facto design using the quantitative approach. The independent variables in the study were learning motivation and self-regulated learning during Covid-19 pandemic on materials of “Derivative” in Trigonometry Function. On the contrary, the dependent variable was learning results of Grade XII students in State Madrasah Aliyah 2 Banjar on given materials.

The population in the study was 112 Grade XII students in State Madrasah Aliyah 2 Banjar Academic Year 2020/2021 that had been divided into four parallel classrooms. The details on the composition were provided in Table 1 below.

Table 1.Research Population

|  |  |
| --- | --- |
| Grade | Total |
| XII Natural Science 1 | 24 |
| XII Natural Science 2 | 28 |
| XII Social Science 1 | 31 |
| XII Social Science 2 | 29 |
| Total | 112 |

Then, the samples that had been selected as the subjects in the study were the students from Grade XII Natural Science 1 State Madrasah Aliyah 2 Banjar. These samples were selected by using purposive sampling technique based on the consideration and the policy of the school principal and the willingness of the Mathematics teacher for the given class. In addition, the purposive sampling technique was implemented because Grade XII had been the only grade that implemented Google Classroom as the learning media for Mathematics.

Next, the data in the study were gathered using questionnaire distribution, test, documentation, and interview. The questionnaire was distributed in order to measure the learning motivation and the self-regulated learning of the students. Following the questionnaire, the test was administered in order to gather the data on the learning results of Mathematics from the students. Afterward, the documentation was implemented in order to attain the general description of the research site, namely State Madrasah Aliyah 2 Banjar, and also the data of teachers, educational personnel, students, learning results, and facilities. Last but not the least, the interview was conducted in order to complement and support the data that had been gathered from the documentation. The interview was conducted with the Principal of the Madrasah, the Head of Administration Department, and the teachers of Mathematics.

The guidelines of the motivation questionnaire were based on the indicators that had been adopted from Lestari & Yudhanegara (2017, p.181). These guidelines were presented in Table 2 below.

Table 2.Guidelines of Learning Motivation Questionnaire

|  |  |  |  |
| --- | --- | --- | --- |
| No | Indicators | Number of Item | Total |
| 1 | Showing learning needs and encouragement | 1,2,3,4,5,6 | 6 |
| 2 | Showing interest and enthusiasm in the given assignments | 7,8,9.10,11,12 | 6 |
| 3 | Being persistent in dealing with assignments | 13,14,15,16,17,18 | 6 |
| 4 | Being diligent in dealing with difficulties | 19,20,21 | 3 |
| 5 | Showing passion and desire for success | 21,22,23,24 | 4 |

In relation to the learning motivation questionnaire, the criteria on learning motivation interpretation were adopted from Arikunto (2010, p.196). These criteria were presented in Table 3 below.

Table 3. Criteria on Learning Motivation Interpretation

|  |  |  |
| --- | --- | --- |
| No | Percentage | Interpretation |
| 1 | 81% - 100% | Very Good |
| 2 | 61% - 80% | Good |
| 3 | 41% - 60% | Moderate |
| 4 | 21% - 40% | Poor |
| 5 | 0% - 20% | Very Poor |

On the other hand, the guidelines on the self-regulated learning were based on the indicators by Wahyuningsih (2020, p.187). These guidelines were presented in Table 4 below.

Table 4. Guidelines on Self-Regulated Learning Questionnaire

| No | Indicators | Number of Item | Total |
| --- | --- | --- | --- |
| 1 | Having initiative to plan learning strategy | 1,2,3,4,5,6,7,8 | 8 |
| 2 | Regulating and directive oneself to learn | 9,10,11,12,13,14,15 | 7 |
| 3 | Not being dependent on others in implementing learning strategy | 16,17,18,19,20 | 5 |
| 4 | Being responsible to oneself in learning | 21,22,23,24,25 | 5 |

In relation to the self-regulated learning questionnaire, the criteria on self-regulated learning interpretation were adopted from Riduwan & Sunarto (2009, p.23). These criteria were presented in Table 5 below.

Table 5. Criteria on Self-Regulated Learning Interpretation

|  |  |  |
| --- | --- | --- |
| No | Mean Percentage | Interpretation |
| 1 | 0% - 19,99 % | Poorly Self-Regulated |
| 2 | 20% - 39,99% | Less Self-Regulated |
| 3 | 40% - 59,99% | Moderately Self-Regulated |
| 4 | 60% - 79,99% | Self-Regulated |
| 5 | 80% - 100% | Highly Self-Regulated |

Eventually, the test that had been administered in the study consisted of 21 items that contained the indicators of learning motivation and self-regulated learning. The two sets of questionnaires had been validated by the experts and then were experimented again to the students of Grade XII Natural Science 2. In conducting the study, only reliable items were selected. Based on the SPSS output, it was found that for the learning motivation questionnaire the Cronbach’s Alpha value had been 0.905. Compared to at rate of significance 5%, the . Since 0.905 > 0.374, it could be concluded that the learning motivation questionnaire had been reliable. On the other hand, it was also found that for the self-regulated learning motivation question the Cronbach’s Alpha value had been 0.892. In relation to the value, it was clear that 0.892 > 0.374. Therefore, it could also be concluded that the self-regulated learning questionnaire had been reliable. Furthermore, after all of the data had been gathered, the data were analysed using questionnaire data analysis technique, learning results data analysis technique, descriptive statistics technique, and inferential statistics technique. The inferential statistics techniques itself consisted of prerequisite test, which covered normality test, linearity test, multicollinearity test, heteroscedasticity test, and multiple linear regression analysis. In order to identify the model fitness within the multiple linear regression, multiple linear regression analysis, coefficient of determination analysis, t-test, and F-test should be conducted.

RESULT AND DISSCUSSION

### Results

#### Learning Motivation Questionnaire Analysis

The data on the learning motivation have been attained from a questionnaire set that consists of 19 items. The mean percentage of each indicator is available in Table 6 and Figure 1 below.

Table 6. Mean Percentage of Each Indicator for Learning Motivation from Grade XII Natural Science 1 Students

|  |  |
| --- | --- |
| Learning Motivation Indicators | Percentage |
| Indicator 1 | 52.32% |
| Showing learning needs and encouragement |
| Indicator 2 | 52.57% |
| Showing interest and enthusiasm in the given assignments |
| Indicator 3 | 46.04% |
| Being persistent in dealing with assignments |
| Indicator 4 | 47.68% |
| Being diligent in dealing with difficulties |
| Indicator 5 | 42.25% |
| Showing passion and desire for success |

Through visualization, the learning motivation of Grade XII Natural Science 1 students can be described as follows.

**Figure 1.** Mean Percentage of Learning Motivation among Grade XII Natural Science 1 Students

Based on the results in Table 6 and Figure 1 above, for the first indicator – showing learning needs and encouragement, the mean percentage of learning motivation among Grade XII Natural Science 1 students is 52.32%, which belongs to the “Moderate” category. This percentage implies that most of the students have encouragement in learning Mathematics and they do really like the lesson because they think that they have the needs to learn it. Then, for the second indicator – showing interest and enthusiasm in the given assignments, the mean percentage is 52.57%, which still belongs to the “Moderate” category. The reason is that half of the students are unwilling to ask the learning materials that they have not understood. In addition, the students only retrieve what the teachers have explained and they do not try to find for other learning resources.

Next, for the third indicator – being persistent in dealing with assignments, the mean percentage is 46.04%, which belongs to “Moderate” category. The reason is that most of the students still procrastinate or did not pay attention well to the assignments that the teachers have assigned. Furthermore, for the fourth indicator – being diligent in dealing with difficulties, the mean percentage is 47.68%, which belongs to the “Moderate” category. The reason is that most of the students are less striving in completing their test items and improving their scores. At the same time, they easily give in whenever they deal with difficult test items. Last but not the least, for the fifth indicator – showing passion and desire for success, the mean percentage is 42.25%, which belongs to the “Moderate” category. This finding show that more than half of the students have the willingness to understand Mathematics and attain the desired results.

#### Self-Regulated Learning Analysis

The data on the self-regulated learning have been attained from a questionnaire set that consists of 23 items. The mean percentage of each indicator is available in Table 7 and Figure 2 below.

Table 7. Mean Percentage on Each Indicator of Self-Regulated Learning from Grade XII Natural Science 1 Students

|  |  |
| --- | --- |
| Self-Regulated Learning Indicators | Percentage |
| Indicator 1 | 42.67% |
| Having initiative to plan learning strategy |
| Indicator 2 | 46.68% |
| Regulating and directive oneself to learn |
| Indicator 3 | 41.44% |
| Not being dependent on others in implementing learning strategy |
| Indikator 4 | 47.71% |
| Being responsible to oneself in learning |

Through visualization, the self-regulated learning of Grade XII Natural Science 1 students can be described as follows.

**Figure 2.** Mean Percentage of Learning Motivation among Grade XII Natural Science 1 Students

Based on the results in Table 7 and Figure 2 above, for the first indicator – having initiative to plan learning strategy, the mean percentage of self-regulated learning among Grade XII Natural Science 1 students is 42.67%, which belongs to “Moderately Self-Regulated” category. This finding is marked by the fact that half of the students have prepared themselves to learn Mathematics, starting from making learning schedule down to learning materials prior to the class and eventually opening themselves to the learning method update. Then, for the second indicator – regulating and directive oneself to learn, the mean percentage is 46.68%, which belongs to the “Moderately Self-Regulated” category. This finding shows that almost half of the students direct themselves to use the learning methods that they prefer, encourage themselves to share their opinion, identify their weaknesses and their errors in learning Mathematics, and improving their performance in Mathematics. Next, for the third indicator – not being dependent on others in implementing learning strategy, the mean percentage was 41.44%, which belongs to the “Moderately Self-Regulated” category. The reason is that most of the students are less able to understand and complete the mathematical test items and that they decide to be dependent on other people. Last but not the least, for the fourth indicator – being responsible to oneself in learning, the mean percentage is 47.71%, which belongs to “Moderately Self-Regulated” category. The reason is that most of the students are less confident with their understanding and self-performance in learning Mathematics; therefore, they become less responsible with themselves.

#### Mathematics Learning Results Analysis

The learning results of Mathematics have been attained from the daily examination score on materials of “Derivatives” from Trigonometry Functions. The data that have been attained in this regard are tabulated into the table of frequency distribution. Based on the data that have been attained, the Mean is 80.29 while the standard deviation (SD) is 6.91. Both values are used in defining the criteria of the students’ Mathematics learning results, which have been summarized in Figure 3 below.

**Figure 3.** Data on Mathematics Learning Results

Based on the results in Figure 3 above, it is clear that the Mathematics learning results of Grade XII Science 1 students from State Madrasah Aliyah 2 Banjar can be described as follows: 6 students belong to “High” category, 10 students belong to “Moderate” category, and 4 students belong to “Low” and “Very Low” category.

#### Statistical Test

##### Classical Assumption Test

Prior to conducting multiple linear regression analysis, the classical assumption test should be conducted first. The classical assumption test in this study consisted of normality test, linearity test, multicollinearity test, and heteroscedasticity test.

###### Normality Test

The normality test was conducted in order to identify the data normality distribution. Within the study, the normality test was conducted using Kolmogorov-Smirnov Method.

Table 8. Learning Motivation Normality Test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tests of Normality** | | | | | | |
|  | Kolmogorov-Smirnova | | | Shapiro-Wilk | | |
| Statistic | Df | Sig. | Statistic | df | Sig. |
| Learning Motivation | .123 | 24 | .200\* | .945 | 24 | .207 |
| \*. This is a lower bound of the true significance. | | | | | | |
| a. Lilliefors Significance Correction | | | | | | |

Based on the SPSS output in Table 8 above, it was found that significance value of Kolmogorov Smirnov had been 0.200. This value was higher than 0.050 (sig. > 0.050). Therefore, it could be concluded that the data had been normally distributed.

**Table 9. Self**-Regulated Learning Normality Test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tests of Normality** | | | | | | |
|  | Kolmogorov-Smirnova | | | Shapiro-Wilk | | |
| Statistic | df | Sig. | Statistic | df | Sig. |
| Self-Regulated Learning | .173 | 24 | .063 | .858 | 24 | .003 |
| a. Lilliefors Significance Correction | | | | | | |

Based on the SPSS output in Table 9 above, it was found that significance value of Kolmogorov Smirnov had been 0.063. This value was higher than 0.050 (sig. > 0.050). Therefore, it could be concluded that the data had been normally distributed.

Table 10. Learning Results Normality Test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tests of Normality** | | | | | | |
|  | Kolmogorov-Smirnova | | | Shapiro-Wilk | | |
| Statistic | df | Sig. | Statistic | df | Sig. |
| Mathematics Learning Results | .130 | 24 | .200\* | .931 | 24 | .101 |
| \*. This is a lower bound of the true significance. | | | | | | |
| a. Lilliefors Significance Correction | | | | | | |

Based on the SPSS output in Table 10 above, it was found that significance value of Kolmogorov Smirnov had been 0.200. This value had been higher than 0.050 (sig. > 0.050). Therefore, it could be concluded that the data had been normally distributed.

###### Linearity Test

The linearity test was conducted in order to identify whether the data had been in accordance with the linear line or not.

Table 11. Linearity Test of Learning Motivation and Mathematics Learning Results

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ANOVA Table** | | | | | | | | | | | | | |
|  | | | | Sum of Squares | | df | | Mean Square | | F | | Sig. | |
| Mathematics Learning Results\*Learning Motivation | Between Groups | (Combined) | 1152.258 | | 13 | | 88.635 | | 15.186 | | .000 | |
| Linearity | 1029.092 | | 1 | | 1029.092 | | 176.315 | | .000 | |
| Deviation from Linearity | 123.166 | | 12 | | 10.264 | | 1.759 | | .190 | |
| Within Groups | | | 58.367 | | 10 | | 5.837 | |  | |  | |
| Total | | | 1210.625 | | 23 | |  | |  | |  | |

Based on the SPSS output in Table 11 above, it was found that Deviation from Linearity had been 0.190. Since this value had been higher than 0.050, it could be concluded that the relationship between learning motivation (X1) and Mathematics learning results (Y) had been linear.

Table 12. Linearity Test of Self-Regulated Learning and Mathematics Learning Results

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ANOVA Table** | | | | | | | |
|  | | | Sum of Squares | df | Mean Square | F | Sig. |
| Mathematics Learning Results\*Self-Regulated Learning | Between Groups | (Combined) | 1156.458 | 12 | 96.372 | 19.571 | .000 |
| Linearity | 1021.537 | 1 | 1021.537 | 207.451 | .000 |
| Deviation from Linearity | 134.922 | 11 | 12.266 | 2.491 | .073 |
| Within Groups | | 54.167 | 11 | 4.924 |  |  |
| Total | | 1210.625 | 23 |  |  |  |

Based on the SPSS output in Table 12 above, it was found that Deviation from Linearity had been 0.073. Since this value had been higher than 0.050, it could be concluded that the relationship between self-regulated learning (X2) and Mathematics learning results (Y) had been linear.

###### Multicollinearity Test

Multicollinearity test was conducted in order to identify whether the independent variables had inter-variable similarity in a model or not. At the same time, this test was conducted in order to avoid the habituation in the decision-making process with regards to the influence on the partial test of the independent variable on the dependent variable.

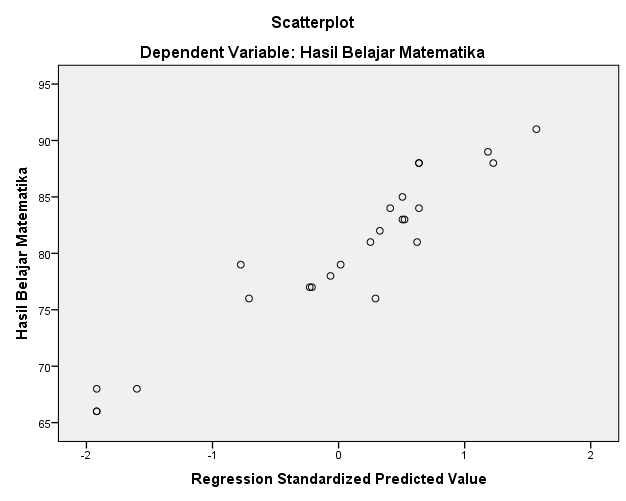
Table 13. Multicollinearity Test

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
| B | Std. Error | Beta | Tolerance | VIF |
| 1 | (Constant) | 13.557 | 4.681 |  | 2.896 | .009 |  |  |
| Learning Motivation | .453 | .117 | .506 | 3.881 | .001 | .255 | 3.929 |
| Self-Regulated Learning | .395 | .107 | .481 | 3.691 | .001 | .255 | 3.929 |
| a. Dependent Variable: Mathematics Learning Results | | | | | | | | |

Based on the SPSS output in Table 13 above, it was found that VIF value had been 3.929. Since this value had still been within the range of 1-10, it could be concluded that multicollinearity did not take place.

###### Heteroscedasticity Test

Heteroscedasticity test was conducted in order to test the difference on the residual variance from one single period of observation to another. Within the study, the heteroscedasticity test was conducted by using Scatterplot.



**Figure 4.** Scatterplot of Heteroscedasticity Test Results

Based on the SPSS output in Figure 4 above, it was apparent that the nods had been spread above and below 0 randomly. At the same time, the nods did not form any waving pattern. Thereby, it could be concluded that heteroscedasticity did not take place.

##### Multiple Linear Regression Analysis

In order to analyse the influence of learning motivation (X1) and self-regulated learning (X2) on Mathematics learning results (Y) from Grade XII Natural Science 1 students on “Derivative” materials from Trigonometry Functions, multiple linear regression was conducted by using SPSS Version 22 software. The equation model that had been used in the study was as follows:

Then, the results of the multiple linear regression analysis were presented in Table 14 below.

Table 14.Multiple Linear Regression Analysis

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 13.557 | 4.681 |  | 2.896 | .009 |
| Learning Motivation | .453 | .117 | .506 | 3.881 | .001 |
| Self-Regulated Learning | .395 | .107 | .481 | 3.691 | .001 |
| a. Dependent Variable: Mathematics Learning Results | | | | | | |

Based on the results in Table 14 above, it was found that significance value (sig.) of learning motivation and self-regulated learning had been 0.001. Since this value had been lower than 0.050, it could be concluded that H0 had been rejected and H1 had been accepted. In other words, learning motivation and self-regulated learning had influence on Mathematics learning results of Grade XII Natural Science 1 students in State Madrasah Aliyah 2 Banjar during Covid-19 pandemics. In addition, the following multiple regression model was also attained:

The implications of the above model were as follows:

* The constant 13.557 showed if learning motivation (X1) and self-regulated learning (X2) were absent then Mathematics learning results would have been 13.557.
* The coefficient of regression for learning motivation (X1) was 0.453, meaning that every 1% increase in the students’ learning motivation (X1) would result in 0.453 increase on Mathematics learning results (Y) under the assumption that the other variable is constant.
* The coefficient of regression for self-regulated learning (X2) was 0.395, meaning that every 1% increase in the students’ self-regulated learning (X2) would result in 0.453 increase on Mathematics learning results under the assumption that the other variable is constant.
* The standard error 4.681 meant that all variables that have been calculated using SPSS had error level 4.681.

Based on the explanation of the multiple linear regression, it was clear that both learning motivation and self-regulated learning had positive value. In other words, it could be concluded that Mathematics learning results had improved because of the independent variables.

##### Correlation Analysis (R) and Coefficient of Determination (R2)

The correlation analysis was conducted in order to identify the strength of the relationship between learning motivation (X1) and self-regulated learning (X2) during Covid-19 pandemic on Mathematics learning results (Y) simultaneously. On the contrary, the coefficient of determination was conducted in order to identify the contribution of learning motivation (X1) and self-regulated learning (X2)on the fluctuation of Mathematics learning results. The results of correlation analysis and coefficient of determination were provided in Table 15 below.

Table 15.Correlation Analysis and Coefficient of Determination

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .953a | .909 | .900 | 2.290 |
| a. Predictors: (Constant), Self-Regulated Learning, Learning Motivation | | | | |

Based on the results in Table 15 above, R-value was 0.953. This R-value showed that there had been very strong relationship between learning motivation and self-regulated learning during Covid-19 pandemic on Mathematics learning results. On the contrary, the results in Table 15 above also showed that R-square had been 0.909. This value emphasized that the contribution of learning motivation and self-regulated learning during Covid-19 pandemic toward Mathematics learning results had been 90.90% while the remaining contribution was made by other variables.

##### t-test

t-test was conducted in order to identify whether learning motivation and self-regulated learning had partially significant influence on Mathematics learning results or not. The results of the t-test were provided in Table 16 below.

Table 16.t-test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 13.557 | 4.681 |  | 2.896 | .009 |
| Learning Motivation | .453 | .117 | .506 | 3.881 | .001 |
| Self-Regulated Learning | .395 | .107 | .481 | 3.691 | .001 |
| a. Dependent Variable: Mathematics Learning Results | | | | | | |

Based on the results in Table 16 above, tcount value of learning motivation was 3.881 while tcount value of self-regulated learning was 3.691 with significance rate 0.001. In the meantime, the ttable value with degree of freedom and is 2.074. Since tcount value of learning motivation had been higher than ttable value, it could be concluded that learning motivation had partially significant influence on Mathematics learning results during Covid-19 pandemic. At the same time, since tcount value of self-regulated learning had been higher than ttable value, it could also be concluded that self-regulated learning had partially significant influence on Mathematics learning results during Covid-19 pandemic.

##### F-test

In the study, F-test was conducted in order to identify the significant influence of learning motivation and self-regulated learning on Mathematics learning results during Covid-19 pandemics. The hypotheses that had been proposed with regards to the test were as follows:

* Null Hypothesis (H0): Learning motivation and self-regulated learning during Covid-19 pandemic do not influence Mathematics learning results of Grade XII Natural Science 1 students from State Madrasah Aliyah 2 Banjar.
* Alternate Hypothesis (H0): Learning motivation and self-regulated learning during Covid-19 pandemic influence Mathematics learning results of Grade XII Natural Science 1 students from State Madrasah Aliyah 2 Banjar.

The results of F-test were presented in Table 17 below.

Table 17. F-test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 1100.518 | 2 | 550.259 | 104.948 | .000b |
| Residual | 110.107 | 21 | 5.243 |  |  |
| Total | 1210.625 | 23 |  |  |  |
| a. Dependent Variable: Mathematics Learning Results | | | | | | |
| b. Predictors: (Constant), Self-Regulated Learning, Learning Motivation | | | | | | |

Based on the results in Table 17 above, it was clear that Fcount had been 104,948. On the contrary, the Ftable value within the study was 3.470 . By comparing Fcount = 104.948 and Ftable = 3.470, it was apparent that Fcount had been higher than Ftable (104.948 > 3.470). Therefore, it could be concluded that H0 had been rejected and H1 had been accepted. In other words, it could be concluded that learning motivation and self-regulated learning had during Covid-19 pandemic had influence on Mathematics learning results of Grade XII Natural Science 1 from State Madrasah Aliyah 2 Banjar on “Derivative” materials from Trigonometry Functions.

### Discussions

Referring to the results of the study, which conclude that learning motivation and self-regulated learning have influence on Mathematics learning materials on “Derivative” materials from Trigonometry Functions, the researchers would like to draw several implications. *First*, it is found that the influence of learning motivation during Covid-19 pandemic on Mathematics learning results is 47.57% with “Very Good” interpretation. In the meantime, the learning results are various with the modus on the “Moderate” qualification or category. These findings show that the higher the learning motivation is the higher the Mathematics learning results will be (Jemudin et al., 2019, p.7; Simatupang, 2019, p.12). At the same time, these findings also show significant relationship between learning motivation and Mathematics learning results (Jatmiko, 2015, p.208; Sumantri & Wardhani, 2017, p.122). In short, learning motivation has influence on the improvement of students’ learning results (Tambunan, 2020, p.113). Therefore, it depends on how the Mathematics teacher builds and develops the learning motivation among the students during Covid-19 pandemic. If the Mathematics teacher is able to develop the students’ learning motivation, then the students’ enthusiasm, interest and encouragement in learning will develop and the development will result in good learning results (Sardiman, 2011, p.87).

*Second*, it is found that the influence of self-regulated learning during Covid-19 pandemic on Mathematics learning results is 44.63% with “Moderately Independent” interpretation. Looking at the interpretation, it can be concluded that the higher the self-regulated learning is, the higher the Mathematics learning results will be (Simatupang, 2019, p.12). When the students have increasingly self-regulated learning, their learning results will improve and their understanding toward a concept will be better (Putri et al., 2020, p.198). In the context of Mathematics learning process, there is a proportional relationship between self-regulated learning and students’ understanding capacity (Lestari, Aisah & Nurafifah, 2020, p.5). Furthermore, self-regulated learning of the students also impacts the awareness and the responsibility of a student in a learning process (Jatisunda, Nahdi & Suciawati, 2020, p.89). A student with high sense of self-regulated learning, despite the online learning system, will always take full responsibility during the learning process. Therefore, it will depend on the teacher to develop the intended self-regulated learning certainly by not giving more Mathematics assignments that demand more self-regulated learning among the students.

*Third*, it is found that learning motivation and self-regulated learning during Covid-19 pandemic have significant influence on Mathematics learning students. This finding implies that despite Covid-19 pandemic learning motivation and self-regulated learning have influence on Mathematics learning results. The statement can be confirmed from each aspect, which has been linear with the Mathematics learning results in this study.

CONCLUSION

Based on the results of the study, the researchers would like to draw several conclusions. First, the size of learning motivation during Covid-19 pandemic on “Derivative” materials from Trigonometry Function among Grade XII students of State Madrasah Aliyah 2 Banjar is 47.57%. Second, the size of self-regulated learning during Covid-19 pandemic on “Derivative” materials from Trigonometry Function among Grade XII students of State Madrasah Aliyah 2 Banjar is 44.63%. Third, both learning motivation and self-regulated learning during Covid-19 pandemic have significant influence on Mathematics learning results.

Despite those conclusions, it turns out that both learning motivation and self-regulated learning influence Mathematics learning results before the outbreak of Covid-19 pandemic. Recalling the positive impact of the two affective aspects toward the cognitive aspect of the students in the form of Mathematics learning results, it is expected that Mathematics teachers motivate the students to be self-regulated in learning Mathematics instead of teaching Mathematics online by giving more assignments to the students since this action will only make the students lazy.

LIST OF REFERENCES

Ambiyar, Aziz, I., Melisa. (2020). Perbedaan kemandirian belajar siswa pada masa pandemi di sman 1 lembah melintang dan sman 1 lembah gumanti. *Jurnal Cendekia: Jurnal Pendidikan Matematika, 04*(02), 1246-1258.

Arikunto, S. (2010). Prosedur Penelitian Suatu Pendekatan Praktek. Jakarta: Rineka Cipta

Atmojo, S.E., Muhtarom, T., Lukitoaji, B.D. (2020). The level of self-regulated learning and self-awareness in science learning in the covid-19 pandemic era. *Jurnal Pendidikan IPA Indonesia, 9*(4), 512-520.

Azka, R., Santoso, R.H. (2015). Pengembangan perangkat pembelajaran kalkulus untuk mencapai ketuntasan dan kemandirian belajar siswa. *Jurnal Riset Pendidikan Matematika, 2*(1), 78-91.

Fane, A., Sugito, S. (2019). Pengaruh keterlibatan orang tua, perilaku guru, dan motivasi belajar terhadap prestasi belajar matematika siswa. *Jurnal Riset Pendidikan Matematika,* 6(1), 53-61.

Gazali, R.Y., Atsnan, M.F. (2017). Peningkatan Motivasi dan Minat Belajar Matematika Siswa Melalui Pendekatan Kontekstual dalam Pembelajaran Matematika yang Bermakna. *Pythagoras: Jurnal Pendidikan Matematika, 12*(2), 123-134

Jatmiko, J. (2015). Hubungan motivasi belajar dengan hasil belajar matematika siswa kelas X SMK Nahdhatul Ulama Pace Nganjuk. *Jurnal Math Educator Nusantara, 1*(2), 205–213. https://ojs.unpkediri.ac.id/index.php/matematika/article/view/237

Jatisunda, Mohamad G., Nahdi, Dede S., Suciawati, V. (2020). Virtual Class During COVID 19: A Self-Regulated Learning Study of Mathematics Pre-Service Teacher. *International Journal on Emerging Mathematics Education (IJEME), 4*(2), 81-94.

Jemudin, F. D. E., Makur, A. P., & Ali, F. A. (2019). Hubungan sikap belajar dan motivasi belajar terhadap prestasi belajar matematika siswa SMPN 6 Langke Rembong. *Journal of Honai Math,* *2*(1), 1–11. <https://doi.org/10.30862/jhm.v2i1.53>

Kurniawan, D., Wustqa, D.U. (2014). Pengaruh perhatian orangtua, motivasi belajar, dan lingkungan sosial terhadap prestasi belajar matematika siswa smp. *Jurnal Riset Pendidikan Matematika, 1*(2), 176-187.

Kurniyawati, Y., Mahmudi, A., Wahyuningrum, E. (2019). Efektivitas *problem-based learning* ditinjau dari keterampilan pemecahan masalah dan kemandirian belajar matematis. *Jurnal Riset Pendidikan Matematika, 6*(1), 118-129.

Lestari, K. E., Yudhanegara, M.R. (2017). *Penelitian Pendidikan Matematika*. Bandung: PT. Refika Aditama

Lestari, W.D., Aisah, L.S., Nurafifah, L. (2020). What is the relationship between self-regulated learning and students’ mathematical understanding in online lectures during the covid-19 pandemic?. *Journal of Physics: Conference Series.* 2nd ISSAME 2020

Nuriyatin, S., Hartono, H. (2016). Pengembangan Pembelajaran Penemuan Terbimbing untuk Meningkatkan Berpikir Kritis dan Motivasi Belajar Geometri di SMP. *Pythagoras: Jurnal Pendidikan Matematika, 11*(2), 207-218.

Putri, H.E., Muqodas, I., Sasqia, A.S., Abdulloh, A., Yuliyanto, A. (2020). Increasing self regulated learning of elementary school students through the concrete-pictorial-abstract approach during the COVID-19 pandemic. *Premiere Educandum: Jurnal Pendidikan Dasar dan Pembelajaran, 10*(2), 187-202.

Qohar, A., Sumarmo, U. (2013). Improving Mathematical Communication Ability and Self Regulation Learning Of Yunior High Students by Using Reciprocal Teaching. *IndoMS, J.M.E., 4*(1), 59-74.

Sardiman, A. M. (2011). *Interaksi dan motivasi belajar* *mengajar*. Raja Grafindo Persada.

Simatupang, Halim. (2019). *Strategi Belajar* *Mengajar Abad Ke-21.* Surabaya: CV. Cipta Media Edukasi

Sumantri, M. S., & Whardani, P. A. (2017). Relationship between motivation to achieve and professional competence in the performance of elementary school teachers. *International* *Education Studies, 10*(7), 118–125. <https://doi.org/10.5539/ies.v11n4p144>

Tambunan, H. (2020). Kinerja guru matematika SMP dalam membangun minat dan motivasi belajar siswa. Jurnal Riset Pendidikan Matematika, 7(1), 108-117

Wahyuningsih, Diana Dewi. (2020). *Panduan untuk Konselor Teknik Self Management dalam Bingkai Konseling Cognitive Behavior untuk Meningkatkan Kemandirian Belajar Siswa SMP,* Jawa Tengah: CV. Sarnu Untung

Warmi, A., Adirakasiwi, Alpha G., Santoso, E. (2020). Motivasi dan kemandirian belajar siswa pada mata pelajaran matematika di masa pandemi covid-19 (studi pada siswa kelas vii smpn 3 karawang tahun pelajaran 2019-2020). *Jurnal Education and Development, 8*(3), 197-202.

Wijaya, T.T., Ying, Z., Suan, L. (2020). Gender and Self-regulated Learning During COVID-19 Pandemic in Indonesia. *Jurnal Basicedu (Research & Learning in Elementary Education), 4*(3), 725-732.

PROFIL SINGKAT

Profil singkat berupa narasi data kelahiran; pendidikan dari jenjang sarjana sampai pendidikan terakhir yang berisi prodi, dan tahun kelulusan serta pekerjaan/aktivitas yang dilakukan sampai saat ini.