The Effect of Students' Anxiety, Learning Discipline, and Learning Motivation on Students' Mathematic Learning Outcomes in Vocational High School

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Abstrak

Rendahnya hasil belajar matematika siswa disebabkan oleh beberapa faktor seperti kecemasan siswa, disiplin belajar, dan motivasi belajar. Penelitian ini bertujuan untuk menganalisis pengaruh kecemasan, disiplin belajar, dan motivasi belajar siswa terhadap hasil belajar matematika siswa. Desain penelitian berbentuk ex post facto dengan melibatkan 235 siswa SMK. Mereka dipilih dengan menggunakan proporsional random sampling. Data diperoleh dengan teknik tes dan non tes. Tes dilakukan untuk mengetahui hasil belajar siswa, sedangkan angket dibagikan kepada siswa untuk mengetahui kecemasan, kedisiplinan belajar, dan motivasi belajar. Instrumen penelitian yang digunakan adalah tes dan angket. Data yang diperoleh dianalisis melalui model persamaan struktural (SEM). Hasilnya menunjukkan bahwa; 1) terdapat pengaruh positif disiplin belajar terhadap pembelajaran matematika siswa, 2) terdapat pengaruh negatif kecemasan siswa terhadap disiplin belajar siswa, 3) terdapat pengaruh negatif langsung yang disumbang oleh kecemasan siswa terhadap belajar siswa motivasi, 4) terdapat pengaruh positif langsung motivasi belajar siswa terhadap disiplin belajar siswa, 5) terdapat pengaruh positif langsung motivasi belajar terhadap hasil belajar matematika siswa, 6) terdapat pengaruh negatif langsung kecemasan terhadap disiplin belajar siswa, dan 7) terdapat pengaruh positif tidak langsung motivasi belajar terhadap hasil belajar matematika siswa melalui disiplin belajar.

Kata Kunci: Displin, Kecemasan, Matematika, Motivasi

Abstract

The low student mathematics learning outcomes are caused by several factors such as students' anxiety, learning discipline, and learning motivation. The study was aimed to analyze the effect of students' anxiety, learning discipline, and learning motivation towards students' mathematic learning outcomes. The research design was in the form of ex post-facto by involving 235 vocational high school students. They were selected by using proportional random sampling. The data were obtained by conducting test and non-test technique. The test was conducted to obtain the students' learning outcomes meanwhile the questionnaire was distributed to the students to gather their anxiety, learning discipline, and learning motivation. The research instruments were test and questionnaire. The obtained data were analysed through structural equation modelling (SEM). The result showed that; 1) there was a positive effect of learning discipline on students' mathematic learning , 2) there was a negative effect of students' anxiety on students' learning discipline, 3) there was a direct negative influence contributed by students' anxiety towards students' learning motivation, 4) there was a direct positive effect of students' learning motivation on students' learning discipline, 5) there was a direct positive effect of learning motivation towards students' mathematic learning outcomes, 6) there was a direct negative effect of anxiety on students' learning discipline, and 7) there was indirect positive effect of learning motivation on students' mathematic learning outcomes through learning discipline.

Keywords: Anxiety, Discipline, Mathematic, Motivation

1. INTRODUCTION

Education is defined as a process of developing an individual's behaviour and ability related to his or her social life through a controlled and selected stimulus (Gunuc & Kuzu, 2015; Ulfiani et al., 2015). It leads to the learning process which is relevant to the common problems faced in the social life in order to make the individual is able to solve those problems. Math is one of compulsory subject adapted in several education system as what has

been occurred in Indonesia in which it has been perceived as compulsory subject in all educational levels (Davidi et al., 2021; L. Masruroh & Reza, 2015). It is due to its essential in humans' daily life since math is recognized as one of science having a strong relationship of social transaction (ai et al., 2020; Giriansyah & Pujiastuti, 2021). Previous study argues that math has a significant role in all fields considering that math can be used for sharing or communicating the contextual case provided in mathematic model (Ikhsan, 2019). It can be stated that math is a subject having substance towards an individual's behaviour or life relevant to the purpose of education.

However, math is often perceived as a difficult subject. Previous study state that math is the most of students agree that math is a difficult and abstract subject influenced by many factors (Juliyanti & Pujiastuti, 2020). It is relevant to the math score of Indonesian students in PISA, 2018 where 85% of Indonesian students' math learning outcomes are categorized into low category. The pre-observation conducted by the researcher in several vocational schools in Buleleng regency shows a similar result in which most of technic students gain low math learning outcomes. It is found out that the low math learning outcomes are caused by the students' internal factors (Dewi & Pujiastuti, 2020; Ekowati et al., 2021). The teachers state that the students is often unattracted to the learning process. It can be a serious problem since math has been perceived as an essential subject.

Students' learning outcomes are inseparable with internal factors within the students themselves. Previous study state that there are many factors related to students' characteristics influencing their academic achievement including; anxiety and motivation (Widodo et al., 2017). It is stated that students' internal factors dealing with students' point of view towards the learning subject itself (Kodirun et al., 2019; A. Masruroh & Nurfitriyanti, 2022). Other researcher ever state that learning outcomes are obtained at the end of learning process which reflects the students' ability influenced by their characteristics and environments (Purbiyanto & Rustiana, 2018). It is argued factors internal cover students' intelligence, talents, interest, motivation, physical and mental health, and learning discipline.

Anxiety is uncomfortable feeling appears when the students face a specific problem related to the subject that they learn (Chaerunisa et al., 2021; Nopela et al., 2020). It is also perceived as an apprehension condition reflecting the occurrence of problem. Mathematic anxiety is classified as an individual psychology or emotional factor influencing their self-efficacy, self-confidence, and learning motivation (Giriansyah & Pujiastuti, 2021; Kodirun et al., 2019). There is study that view anxiety as an obstacle in learning process disturbing the students' cognitive function in concentrating, remembering, and forming the concept to solve the problem (Zuraidah et al., 2020). It is added that the higher anxiety than the worse reaction frequently appears in the learning process.

Many problems can be emerged due to students' high learning anxiety. Low learning motivation is one of the problems occurs due to high anxiety since it is recognized as a form of anxiety itself (Artama et al., 2022; Savitri et al., 2022). A successful learning process is determined by learning motivation in which it is the main factor assisting students to achieve the learning process (Rahman et al., 2021;Saptenno et al., 2019). Previous study define motivation as the foundation of an individual's behaviour influenced by several factors (Moh Ghoizi Eriyanto et al., 2021). Motivation is also perceived as a desire of achieving satisfaction in the learning process obtained from learning outcomes. Students with higher motivation tend to comprehend the learning materials easier (Munir et al., 2022; Saptenno et al., 2019). It seems that motivation is a factor affecting students' learning outcomes viewed from their behavioural change.

In addition, learning discipline is another internal factor influencing students' learning outcomes. Learning discipline is an attitude of being obedient towards a certain rule for controlling their learning progress to achieve a better learning outcome (Matussolikhah &

Rosy, 2021; Rusni & Agustan, 2018). Previous study views learning discipline as an essential factor in forming an individual's character to do avoid unexpected problems appearing in the learning process to perceive an optimal outcome (Novianty, 2020). The students who obey the rule tend to have a better learning outcome (Chaerunisa & Latief, 2021; Handayani & Subakti, 2020). Other study show that learning discipline has a direct influence on students' learning outcomes (Purbiyanto & Rustiana, 2018). It becomes a significant factor determining the students' academic achievement.

Students' internal factors have been examined by many researchers to find out their contribution on students' learning outcomes. Previous study investigate the effect of anxiety towards the learning outcomes of junior high school students (Dewi & Pujiastuti, 2020). It reveals that anxiety has a significant affect towards students' learning outcomes. Other study examine the effect of anxiety and self-concept towards students' mathematic learning outcomes (Juliyanti & Pujiastuti, 2020). It is found that there is a simultaneous effect between anxiety and self-concept towards students' mathematic learning outcomes. There is also study that conducts a study investigating the effect of learning discipline on students' mathematic learning outcomes (Rusni & Agustan, 2018). It shows that learning discipline significantly affects students' mathematic learning outcomes. Those previous studies indicate that anxiety, motivation, and learning discipline are essential factors on students' learning outcomes. Regarded to the recent problem found in vocational high schools in Buleleng, this study is conducted to analyze the correlation among anxiety, motivation, and learning discipline towards students' mathematic learning outcomes.

2. METHODS

This study was designed in the form of ex post-facto consisted of four variables, such as; anxiety, motivation, learning discipline, and learning outcomes. The study investigated the effect of anxiety, motivation, learning discipline towards students' mathematic learning outcomes by involving vocational high school students in Buleleng regency as the population. There were 235 vocational students used as the research sample in which they were the representatives of SMKN Bali Mandara, SMKN 3 Singaraja, and SMKN 1 Gerokgak. They were selected by using proportional random sampling. The data were collected by conducting test and non-test technique. Test was conducted to obtain students' mathematic learning outcomes and non-test was conducted to obtain students' anxiety, motivation, and learning discipline. Multiple-choice and questionnaire were the research instruments used during data collection. The obtained data were analysed by conducting multivariate analysis through SEM analysis.

3. RESULTS AND DISCUSSION

Result

The obtained data were analysed for finding their normality, linearity, multicollinearity, and heteroscedasticity as the perquisite test. The normality test showed that the obtained data had normal distribution viewed from the significant value $0.21 > 0.05$. Meanwhile the linearity test was presented in Table 1.

Table 1. Linearity Test Result

Independent Variable	Dependent Variable	Sig. Deviation from Linearity	Sig. Linearity
X1	Y	0.363	0.000
X2	Y	0.426	0.000
X3	Y	0.349	0.000

Independent Variable	Dependent Variable	Sig. Deviation from Linearity	Sig. Linearity
X1	X3	0.586	0.000
X2	X3	0.244	0.000
X1	X2	0.425	0.000

Note: X1 : students' anxiety
X2 : students' learning motivation
X3 : students' learning discipline
Y : students' mathematic learning outcomes

Table 1 showed the linearity between each variable. It was shown that the sig. deviation from linearity of each variable was higher than 0.05 which meant that there was no linearity between each variable. It was also found that the sig. linearity was lower than 0.05 indicating that the regression coefficient was significant. In addition, multicollinearity test result was presented in Table 2.

Table 2. The Result of Multicollinearity Test

Independent Variable	Dependent Variable	Tolerance	VIF	Note
X1	Y	0.134	7.463	No multicollinearity
X2	Y	0.147	6.792	No multicollinearity
X3	Y	0.226	4.428	No multicollinearity
X1	X3	0.161	6.203	No multicollinearity
X2	X3	0.161	6.203	No multicollinearity
X1	Y	1.000	1.000	No multicollinearity

Table 2 presented that there was no multicollinearity of each variable since the VIF was less than 10. The heteroscedasticity test revealed that there was no heteroscedasticity problem occurred among the variable since there was no a certain pattern spread between 0 and Y axis. The data were continuously analyzed for the hypothesis testing in which the results were presented as show in Table 3.

Table 3. The Multivariate Analysis Result

No.	The Correlational Between Variables	Coefficient	T Statistics (|O/STDEV|)	P Values
1	Learning Discipline -> Mathematic Learning Outcomes	0.519	19.231	0.000
2	Anxiety -> Learning Discipline	-0.533	4.253	0.000
3	Anxiety -> Mathematic Learning Outcomes	-0.269	3.734	0.000
4	Anxiety -> Learning Motivation	-0.916	39.681	0.000
5	Learning Motivation -> Learning Discipline	0.365	2.920	0.004
6	Learning Motivation -> Mathematic Learning Outcomes	0.242	3.402	0.001
7	Anxiety -> Learning Discipline -> Mathematic Learning Outcomes	-0.511	4.125	-
8	Learning Motivation -> Learning Discipline -> Mathematic Learning Outcomes	0.351	5.079	-

Based on Table 3, there were several findings obtained from the results. It was found out that there was a positive effect of learning discipline on students' mathematic learning with the coefficient 0.519 or 51,9% with T-statistic 19.231 and P-value 0.000. There was a negative effect of students' anxiety on students' learning discipline with the coefficient -

0.533 or -53,3% with T-statistic 4.253 and P-value 0.000. There was a direct negative influence contributed by students' anxiety towards students' learning motivation with the coefficient -0.916 or -91,6% with T-statistic 39.681 and P-value 0.000. There was a direct positive effect of students' learning motivation on students' learning discipline with the coefficient 0.365 or 36.5% with T-statistic 2.920 and P-value 0.004. It was also shown that there was a direct positive effect of learning motivation towards students' mathematic learning outcomes with the coefficient 0.242 or 24.2% with T-statistic 3.402 and P-value 0.001. There was also a direct negative effect of anxiety on students' learning discipline with the coefficient -0.511 or -51,1% with T-statistic 4.125. In addition, it was found that there was indirect positive effect of learning motivation on students' mathematic learning outcomes through learning discipline with coefficient 0.351 or 35.1% with T-statistic 5.079.

Discussions

The current study showed that students' learning discipline towards students' learning outcomes. This finding was relevant to the previous study conducted by previous study which also found that learning discipline had a significant influence on students' economic learning outcomes (Arista, 2018). It strengthened the study conducted by other study which revealed that learning discipline had a direct influence towards students' learning achievement (Purbiyanto & Rustiana, 2018). There is also study that investigated the influence of students' learning discipline on students' learning outcomes in social science course (Chaerunisa et al., 2021). The current research supported the existence of learning discipline as the internal factor determining students' academic achievement in which it affected students' behaviours during the learning process reflected on their learning outcomes (Matussolikhah & Rosy, 2021; Novianty, 2020; Rusni & Agustan, 2018).

A negative effect of students' anxiety towards students' learning discipline found in this current research showed that there was a correlation between students' anxiety and students' learning discipline. It supported the study showing that there was a correlation between students' anxiety and students' learning discipline (Asmawati et al., 2021). Another result also found that students' anxiety had a significant effect towards students' learning motivation. It was relevant to the result found that students' anxiety and learning motivation had significant influence towards students' learning outcomes in which students' anxiety and learning motivation had a partial correlation (Putri & Kurniasari, 2020). It indicated that anxiety as an individual psychology influenced students' learning motivation (Akmalia & Ulfah, 2021; Giriansyah & Pujiastuti, 2021). The current study directly showed that students' anxiety affected students' learning outcomes. It was a further research supporting the previous studies which also discovered the same findings (Juliyanti & Pujiastuti, 2020; Zuraidah et al., 2020).

However, the finding of this study proved that students' anxiety, learning discipline, and learning motivation had a contribution towards students' mathematic learning outcomes. It extended the finding of several previous studies. Previous study discovered that students' anxiety and learning motivation influenced students' learning achievement (Widodo et al., 2017). The similar finding was also found by study showing that there was an effect given by students' anxiety and learning motivation (Savitri et al., 2022). There is also study found out that learning discipline had a significant influence towards students' learning outcomes in methodology classrooms (Novianty, 2020). It was relevant to the recent study. Therefore, the current finding strengthened the previous studies which analyze the effect of students' anxiety, learning discipline, and learning motivation towards students' learning outcomes particularly in mathematics.

This research can provide a better understanding of how students' anxiety, learning discipline, and learning motivation can influence mathematics learning outcomes in

vocational high schools. The results can help teachers, researchers and educational policy makers to design more effective learning strategies. In addition, the results of this research can be used to design educational programs or interventions that are more targeted. For example, if student anxiety turns out to be a significant factor, schools can develop programs to reduce student anxiety. However, this research also has limitations, this research seems to consider only a few factors that influence mathematics learning outcomes. There are many other factors, such as the quality of teaching, parental support, and other student characteristics that can also play an important role in mathematics learning outcomes.

4.   CONCLUSION

This study concludes that there is an effect of students' anxiety, learning discipline, and learning motivation towards students' learning outcomes. Specifically, the findings are; 1) there is a positive effect of learning discipline on students' mathematic learning , 2) there is a negative effect of students' anxiety on students' learning discipline, 3) there is a direct negative influence contributed by students' anxiety towards students' learning motivation, 4) there is a direct positive effect of students' learning motivation on students' learning discipline, 5) there is a direct positive effect of learning motivation towards students' mathematic learning outcomes, 6) there is a direct negative effect of anxiety on students' learning discipline, and 7) there is indirect positive effect of learning motivation on students' mathematic learning outcomes through learning discipline. These findings can be used as the reference in conducting further study or consideration in conducting mathematic learning process. Further investigation is suggested to be conducted to have deeper insight.

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