

Math anxiety, self-regulated learning, and academic procrastination in class VIII Students: A case study at SMPN 2 Alalak

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Abstrak: The research aimed to (1) determine students' math anxiety levels, (2) know the level of students' self-regulated learning, (3) know the level of student academic procrastination, (4) determine the relationship between math anxiety and students' academic procrastination, (5) and determine the relationship between self-regulated learning and students' academic procrastination. The quantitative research method used correlational research, which is used to determine the relationship between two or more variables. The population was 152 students in class VIII of SMPN 2 Alalak. Samples were 62 students and were selected using a cluster random sampling technique. Data collection techniques were questionnaires, interviews, and documentation. The data analysis technique used descriptive analysis and hypothesis test using the Spearman rank correlation test. The finding showed that, first, the student's math anxiety level is in the medium category with a percentage of 62.90%. Second, the students' self-regulated learning level is in the medium category with a percentage of 54.84%. Third, the level of student academic procrastination is in the medium category with a percentage of 75.81%. Fourth, there is a positive relationship between math anxiety and students' academic procrastination in Mathematics subjects in class VIII SMPN 2 Alalak. And, there is a negative relationship between self-regulated learning and students' academic procrastination in Mathematics in class VIII SMPN 2 Alalak.

Kata Kunci: math anxiety; self-regulated learning; academic procrastination

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INTRODUCTION

In academic terms, a tendency of an individual to postpone starting or completing work by doing other activities, resulting in poor performance and unable to complete tasks on time is called academic procrastination (Asani, 2023; Sejati, 2013). Procrastinating carried out by students will certainly harm their academic achievement. One of the disadvantages, they might experience failure when they continue doing the behavior. The negative impact is when the deadline for submitting assignments, students are still not finished with their work, or when they are finished, their assignments are not optimal.

This behavior can be detrimental to students and cause failure in their education (Setyowani & Sunawan, 2018). According to the University of Buffalo Counseling Services in Rangkuti's research, procrastination occurs due to several factors including poor time management, difficulty concentrating, feeling anxious with assignments, fear of getting bad grades and negative emotions, a fear of failure and being unable to do so (Rangkuti, 2017). More specifically in Mathematics terms, the negative emotions and anxiety that students feel on Mathematics learning are often called Mathematical Anxiety (Brewster & Miller, 2023; Nugroho et al., 2023; Ryan et al., 2023; Zanabazar et al., 2023).

Based on a short interview with the Mathematics Teacher in class VIII of SMPN 2 Alalak, namely Mr. Azhar Hasbi S.Si, the teacher stated that procrastination also occurred in students in class VIII of SMPN 2 Alalak. According to him, during Face-to-Face Learning (PTM) after the implementation of Distance Learning (PJJ) during the Covid-19 pandemic, some students had poor learning discipline. For example, several students were postpone submitting Mathematics assignments. During learning, students rarely dare to ask questions, even though they do not understand and tend to be silent, which makes students' understanding of the Mathematics material being taught increasingly poor. When the teacher asked to work on mathematics questions in front of the class, some students looked anxious and avoided making eye contact with the teacher so as not to be pointed at to do the work.

If this situation continues, it may increase students' levels of academic procrastination in Mathematics subjects. The higher the Mathematical anxiety, the more students will engage in academic procrastination (Rangkuti, 2017). The correlation between anxiety and academic procrastination is positive. This means that the more anxious a person is, the more likely that person is to decide to postpone, and vice versa (Siaputra & Natalya, 2013). Several works of literature explain the internal factors of procrastination, namely physical conditions such as fatigue and psychological conditions such as low self-control, self-esteem motivation, and a student's perfectionism (C. A. P. Putri & Gumindari, 2022).

Based on the background, the articles try to discuss one of the internal factors, detailed as one of the variables in this research, namely self-control in learning, also often called self-regulated learning. This was motivated by the interview with class VIII students at SMPN 2 Alalak. They argue that they were overwhelmed with the existing study schedule. They state the reason that learning was carried out online for approximately 2 years during the COVID-19 pandemic, and they are accustomed to spending a lot of time just lazing around and playing online games with friends rather than on academic matters. </>

Then, when switching to Face-to-Face Learning (PTM), students find it difficult to organize or control themselves to participate in learning well, especially in Mathematics subjects. In addition, from the beginning, they have assumed that Mathematics is difficult so students' confidence, interest, and self-drive in completing Mathematics assignments tends to be low. Irrational thinking toward Mathematics causes a low level of self-awareness to control and self-regulated to achieve learning goals. It assumes that the problem is closely related to self-regulated learning. According to Dinata in her research, self-regulated learning has an essential role in the learning process as it can help direct students in independent learning mechanisms, namely making study schedules, setting learning goals, and exploring additional information that students may need in independent learning. Students with good self-regulated learning can manage their own time to study, and seek additional information about knowledge and subject matter to support their learning process from various sources (Dinata et al., 2016).

So, the Mathematics assignments given by the teacher will be completed well and on time. Supported by Savira and Suharsono, concluded that students with low self-regulated learning will have a higher level of academic procrastination. In contrast, students with high self-regulated learning will be followed by low academic procrastination (Alfina, 2014).

METHODS

The research type was field research with a quantitative approach. Field research is carried out in a chosen place or location to research or investigate a phenomenon that occurs in that place (Fathoni, 2006; Ramírez-Castañeda et al., 2022). The quantitative method used correlational research to determine a relationship between two or more variables. Correlational research can also be said to be a part of ex post facto research because, in these two research procedures, the researcher does not manipulate the existing variables. Meanwhile, the difference is that in correlational research, researchers do not identify or differentiate between the independent variable and the dependent variable. Here, correlational research was carried out to determine a relationship between math anxiety and academic procrastination and a relationship between self-regulated learning and academic procrastination.

The population was all students in class VIII of SMPN 2 Alalak for the 2022/2023 academic year. A cluster random sampling technique is used to determine the sample, namely the random selection of study group members of the population. So, it is different from the simple random sampling technique, which randomizes each subject individually from members of the population (Azwar, 2004). In this study, two classes

were selected randomly from all members of the existing population group. Then, those selected as research samples were students in classes VIII-A and VIII-E, with a total of 62 students. Three data collection techniques were used in this research, including questionnaires, interviews, and documentation. The questionnaire was used to measure the level of each variable and measure the correlation coefficient between math anxiety and self-regulated learning on students' academic procrastination in Mathematics lessons in class VIII of SMPN 2 Alalak. Meanwhile, interviews are only used to strengthen, and complete the existing data, and support the needed data in discussing research findings related to research variables. The math anxiety variable instrument guideline was prepared based on the theory of math anxiety symptoms, proposed by Nevid et al. (2005). However, the researcher developed it to adapt to the objectives of this research. The indicator items taken on this scale manifest aspects of mathematics anxiety which include personal aspects such as physical, cognitive, and behavioral.

Table 1. The guideline of Math Anxiety Instrument

No.	Aspect	Indicator	Items		Number of Items
			<i>Favorable</i>	<i>Unfavorable</i>	
1.	Physical	Disorders of body condition	1, 2, 16, 32, 34	9, 10, 26	8
		Disorders of body function	3, 27, 31, 33	-	4
2.	Cognitive	Not confident	4, 17, 28	11, 24, 25	6
		Low self-efficacy	5, 18, 29, 35	12, 23	6
3.	Behavioral	Overwhelmed worry/fear	6, 19, 30	13, 22	5
		Silence	7, 20	14	3
		Avoid	8, 21	15	3
		Total		35	

The instrument guideline for the Self-Regulated Learning variable was prepared based on the theory of aspects of self-regulated learning by Zimmerman in Puspitasari's research. Then, it adapted it to the objectives of this research. Aspects of self-regulated learning include metacognitive aspects, intrinsic motivation, and active learner behavior.

Table 2. The guideline of Self-regulated Learning Instrument

No.	Aspect	Indicators	Items		Number of Items
			<i>Favorable</i>	<i>Unfavorable</i>	
1.	Metacognitive	Planning Ability	1, 17	23, 30	4
		Setting goals	2, 5, 36	32	4
		Self-control in learning	3, 9, 16	7, 33	5
		Ability to evaluate	4, 12, 13	22, 31	5
2.	Intrinsic Motivation	Beliefs	6, 34	25	3
		Interests	10, 18	27, 29	4
3.	Active Learner Behavior	Selects Environment	19, 20	24, 26	4
		Managing the Environment	8, 11, 35	–	3
		Creating an Environment	14, 15	21, 28	4
Total					36

The academic procrastination instrument guideline was prepared based on Ferrari's theory in Aulia's research, which was then adapted to the objectives of this research. Aspects of procrastination include postponement in starting or completing academic assignments, slowness in the process of completing assignments, gaps between plans and actual performance, and carrying out other activities besides completing assignments.

The instrument guideline will then be described into statement items formulated in a questionnaire instrument with scoring based on a Likert scale. The instrument needs to be tested before finally being used in research to achieve the quality of the measuring instruments or research instruments (Lestari et al., 2015). Of the 35 statement items on the math anxiety questionnaire, 29 statement items met the valid and reliable criteria. Of the 36 statement items in the self-regulated learning questionnaire, 31 statement items met the valid and reliable criteria. Also, of the 40 statement items in the academic procrastination questionnaire, 32 statement items met the valid and reliable criteria. The data analysis technique was a descriptive and inferential statistical analysis. The data was obtained from a questionnaire that interpreted

the students' existing attitudes or conditions without being given prior treatment, namely related to the variables in this research. As it uses a Likert scale, the data was ordinal data. Therefore, it used nonparametric statistical techniques to answer the hypotheses. The non-parametric statistical hypothesis test used the Spearman rank correlation test. Spearman rank correlation test was assisted by the IBM SPSS version 25 application as a tool in hypothesis testing.

Table 3. The guideline of Academic Procrastination Instrument

No.	Aspect	Indicators	Items		Number of Items
			<i>Favorable</i>	<i>Unfavorable</i>	
1.	Postpone in starting or completing assignments	Postpone in starting assignments	1, 19, 31, 32	29, 35	6
		Postpone in completing assignments	3, 5, 30	10, 25	5
2.	Slow in the process of completing assignments	Requires a long time to prepare in completing assignments	9, 11, 36	33	4
		Takes a long time to complete assignments	12, 15, 39	24, 38	5
3.	Discrepancy between plans and actual performance	Mismatch between plans and actions	16, 17, 37	27, 40	5
		Inability to complete assignments on time	6, 7	26, 28	4
		Incompatibility of the time specified for completing assignments	13, 18	14, 21	4
4.	Carrying out other activities apart from completing assignments.	Involving in other activities	14, 23	22	3
		Doing other things that are more fun	2, 8	20, 34	4
		Total			40

RESULT AND DISCUSSION

Result

The data was obtained from the results of a questionnaire for students in classes VIII-A and VIII-E of SMPN 2 Alalak for the 2022/2023 academic year, which has a total of 62 students. This research had three variables, math anxiety, self-regulated learning, and student academic procrastination. The questionnaire was closed, consisting of four alternative answers, namely Very Often (SS), Often (S), Rarely (J), and Never (TP). Then, the data is presented in a data tabulation to make it easier for data processing and data analysis.

Math Anxiety

Data on students' math anxiety was obtained from a closed questionnaire, with a total of 29 statements, containing 20 favorable question items and 9 unfavorable question items. A description of the math anxiety data is presented in Table 4.

Table 4. Description of Math Anxiety Data

Data	Average	Standard Deviation
<i>Math anxiety</i>	72,5	14,5

Based on Table 4, the average student math anxiety is 72.5 and the standard deviation is 14.5. After that, the data is presented in a table of math anxiety score categorization in Table 5.

Table 5. Categorization of Math Anxiety Scores

No.	Score	Category	Frequency	Percentage
1.	$X \geq 87$	High	1	1.61%
2.	$58 \leq X < 87$	Moderate	39	62.90%
3.	$X < 58$	Poor	22	35.48%
Total			62	100%

Based on Table 5, of the 62 respondents, 1 student has a high math anxiety category with a percentage of 1.61%. Second, 39 students have a moderate math anxiety category with a percentage of 62.90%. And, 22 students have a poor math anxiety category with a percentage of 35.48%.

Self-Regulated Learning

Data on students' self-regulated learning was obtained from a closed questionnaire with a total of 31 statements, containing 21 favorable question items and 10 unfavorable question items. A description of the self-regulated learning data is presented in Table 6.

Table 6. Description of Self-regulated Learning Data

Data	Average	Standard Deviation
<i>Math anxiety</i>	77,5	15,5

Based on Table 6, the average student self-regulated learning is 77.5, and the standard deviation is 15.5. After that, the data is presented in a table of self-regulated score categorization in Table 7.

Table 7. Categorization of Self-Regulated Learning Scores

No.	Score	Category	Frequency	Category
1.	$X \geq 93$	High	26	41.94%
2.	$62 \leq X < 93$	Moderate	34	54.84%
3.	$X < 62$	Poor	2	3.23%
Total			62	100%

Based on Table 7, of the 62 respondents, 26 student has a high self-regulated learning category with a percentage of 41.94%. Second, 34 students have a moderate self-regulated learning category with a percentage of 54.84%. And, 2 students have a poor self-regulated learning category with a percentage of 3.23%.

Academic Procrastination

A description of the academic procrastination data is presented in Table 8.

Table 8. Description of Academic Procrastination Data

Data	Average	Standard Deviation
<i>Math anxiety</i>	80	16

Based on Table 8, the average student academic procrastination is 80, and the standard deviation is 16. After that, the data is presented in a table of academic procrastination score categorization in Table 9.

Table 9. Categorization of Academic Procrastination Scores

No.	Score	Category	Frequency	Percentage
1.	$X \geq 96$	High	0	0.00%
2.	$64 \leq X < 96$	Moderate	47	75.81%
3.	$X < 64$	Poor	15	24.19%
Total			62	100%

Based on Table 9, of the 62 respondents, 47 students have a moderate academic procrastination category with a percentage of 75.81%. Second, 15 students have a poor academic procrastination category with a percentage of 24.19%. And, no student has a high academic procrastination category.

The Relationship Between Math Anxiety and Academic Procrastination

The results of the Spearman rank correlation test using the IBM SPSS version 25 application are presented in Table 10.

Table 10. Spearman Rank Correlation Test Results for Math Anxiety with Academic Procrastination

Correlations				
			Math Anxiety	Academic Procrastination
Spearman's rho	Math Anxiety	Correlation Coefficient	1.000	.519**
		Sig. (2-tailed)	.	.000
		N	62	62
	Academic Procrastination	Correlation Coefficient	.519**	1.000
		Sig. (2-tailed)	.000	.
		N	62	62

** . Correlation is significant at the 0.01 level (2-tailed).

Based on Table 10, the correlation coefficient for rank Spearman math anxiety and academic procrastination is 0.519. The coefficient value is positive. This shows a correlation in the same direction. This means

that, if math anxiety is high, academic procrastination is also high, and/or if the math anxiety is poor, the academic procrastination is also poor.

Next, hypothesis testing is carried out by comparing the significance level with the error.

First Hypothesis;

H_0 = There is no relationship between math anxiety and students' academic procrastination in Mathematics subjects in class VIII SMPN 2 Alalak.

H_1 = There is relationship between math anxiety and students' academic procrastination in Mathematics subjects in class VIII SMPN 2 Alalak.

Benchmarks for decision making are based on; (1) If the significance level is > 0.01 , then H_0 is accepted; (2) If the significance level is ≤ 0.01 , then H_0 is rejected.

Based on Table 10, a significance value of 0.000 is obtained. The sig number is $0.00 < 0.01$, so H_1 is accepted and H_0 is rejected. This means that there is a relationship between math anxiety and students' academic procrastination in Mathematics subjects in class VIII SMPN 2 Alalak.

The Relationship Between Self-Regulated Learning and Academic Procrastination

The results of the Spearman rank correlation test using the IBM SPSS version 25 application is presented in Table 11.

Table 11. Spearman Rank Correlation Test Results of Self-regulated learning and Academic Procrastination

		Correlations		
			Self-regulated Learning	Academic Procrastination
Spearman's rho	Self-regulated Learning	Correlation Coefficient	1.000	-.694**
		Sig. (2-tailed)	.	.000
		N	62	62
	Academic Procrastination	Correlation Coefficient	-.694**	1.000
		Sig. (2-tailed)	.000	.
		N	62	62

** . Correlation is significant at the 0.01 level (2-tailed).

Based on Table 11, the correlation coefficient for rank Spearman math anxiety and academic procrastination is -0.694. The coefficient value is negative. This shows a correlation but in the opposite direction. This means that, if math anxiety is high, academic procrastination will decrease, and/or if self-regulated learning is poor, academic procrastination will increase.

Next, hypothesis testing is carried out by comparing the significance level with the error.

Second Hypothesis;

H_0 = There is no relationship between self-regulated learning and students' academic procrastination in mathematics subjects in class VIII SMPN 2 Alalak

H_1 = There is relationship between self-regulated learning and students' academic procrastination in mathematics subjects in class VIII SMPN 2 Alalak

Benchmarks for decision making are based on; (1) If the significance level is > 0.01 , then H_0 is accepted; (2) If the significance level is ≤ 0.01 , then H_0 is rejected

Based on Table 10, a significance value of 0.000 is obtained. The sig number is $0.00 < 0.01$, so H_1 is accepted and H_0 is rejected. This means that there is a relationship between math anxiety and students' academic procrastination in Mathematics subjects in class VIII SMPN 2 Alalak.

Discussion

Math Anxiety, Self-regulated Learning and Academic Procrastination

The findings show that the highest level of math anxiety among students is in the moderate category with 39 students. The second place is in the poor category with 22 students. And, only 1 person has a high category of math anxiety. An interview with the Mathematics teacher in class VIII found that one student

clearly showed signs of anxiety about Mathematics lessons. The teacher added that once he asked the student to answer a mathematics question in front of the class, he did not move from his seat even though the teacher said he would help him to complete the question.

Nevid et al. (2005) stated in their research that there are three forms of symptoms of mathematics anxiety. First, physical aspects such as tension, shaking, restlessness, and sweating. Second, in cognitive aspects, such as pessimistic thoughts, low ability in Mathematics, too much worry and uncertainty about the results of his Mathematics work, and feelings of fear of being made fun of or laughed at if he is unable to complete his Mathematics assignments. Third, the behavior of students are silent because they are afraid of being laughed at, and are worried about doing Mathematics assignments from the teacher (Nevid et al., 2005).

Furthermore, on the self-regulated learning, the findings show the students' level of self-regulated learning is mostly in the moderate category with a total of 34 students. Then, the second place is in the high category with a total of 26 students. And, 2 students are in the poor category. This shows that almost all respondents have a moderate to high level of self-regulated learning.

This means that, based on the theory, almost all respondents have good metacognition. In his research, Zimmerman stated that metacognition is an important aspect of self-regulated learning because it makes students aware of what they will do to help their learning process, such as planning learning to be effective and efficient, setting learning goals, and evaluating each material and assignment. They tend to learn, which will give the effect of satisfaction and feelings of joy to students when they can achieve their learning goals. Also, students can independently organize and organize their learning activities to be enjoyable activities, utilize or create a good learning environment. As the output, they can actively participate in their learning process fully.

Then, regarding academic procrastination, the findings show that the student's level of academic procrastination in Mathematics subjects is mostly in the moderate category with 47 students. 45 students are in the poor category. And, there are no students with a high level of academic procrastination. This data shows that all respondents have a moderate to poor level of academic procrastination. Because this research was conducted when face-to-face learning was employed, after approximately 2 years of online with distance learning (PJJ), it may stated that the results are the state of students' academic procrastination towards Mathematics lessons in the post-pandemic COVID-19.

In line with Najla Syafiq, she conducted research during the Covid-19 pandemic. Her research stated that the average academic procrastination was also at the lower middle level. The largest is in the medium category with a percentage of 63%. Then, in the poor category is 17%. However, the difference with this research is that 20% of the total respondents had academic procrastination in the high category. This shows that the differences in learning processes implemented by the government caused by the Covid-19 pandemic also affect the level of academic procrastination.

Nowadays, procrastination is a negative issue that frequently arises and increases among students due to the implementation of Distance Learning (PJJ). Then, after Face-to-Face Learning (PTM) was employed, the tendency for academic procrastination behavior decreased but was still found.

Fauziyah (2023) in his research stated that academic procrastination is one of the obstacles in the post-pandemic face-to-face learning process. Procrastination of learning makes it less than optimal, especially face-to-face learning after the Covid-19 pandemic. For example, students who do not pay attention to the material presented by the teacher in class due to their previous habit of online learning at home. Here, they seem to be having fun with their friends in class and do not write the material until the teacher shouts or admonishes them to be quiet and orders them to write. Then, they showed their faces showing anxiety and fear and fell silent for a moment.

The relationship between Math Anxiety and Academic Procrastination

In short, there is a positive relationship based on the Spearman rank correlation analysis. Then, an increase in each score/value of the math anxiety variable will be followed by an increase in the value/score of the academic procrastination variable. On the other hand, if the math anxiety variable decreases, the academic procrastination variable decreases. In line with N. M. A. Putri and Kurniasari (2020), whose research aimed to determine the effect of mathematics anxiety on academic procrastination, there was a significant relationship between mathematics anxiety and academic procrastination.

According to the University of Buffalo Counseling Services in Rangkuti's research, procrastination occurs due to several factors. These include feeling anxious because overwhelmed with assignments, feeling fear of getting bad grades, having negative beliefs about themselves, and feeling unable to succeed (Rangkuti, 2017). Nurrisqi (2019) argued that the factors that influence academic procrastination are divided into two, internal factors and external factors.

Internal factors include physical conditions such as health problems of fatigue. Someone who experiences fatigue tends to engage in academic procrastination. Then, the psychological condition or personality of an individual, such as social abilities. This condition appears in an individual's ability to self-regulated and control anxiety in social relationships. The level of individual motivation usually also influences the tendency to carry out procrastination. The higher the motivation, the lower an individual's tendency to procrastinate, and vice versa. Apart from that, aspects of self-control can also influence an individual to procrastinate.

External factors include parental factors and the surrounding environment. Parental parenting patterns that tend to be highly authoritarian and an indifferent environment can influence a person to engage in chronic academic procrastination behavior.

Based on several theories, math anxiety is not the only cause of increasing academic procrastination behavior. There are other academic procrastination factors such as self-regulated learning, self-efficacy, self-esteem, pattern of foster care, and so on. </>

The Relationship Between Self-Regulated Learning and Academic Procrastination

Based on the Spearman rank correlation analysis, showed that there is a negative relationship. An increase in each score/value of the self-regulated learning variable will also be followed by a decrease in the value/score of the academic procrastination variable. On the other hand, if the self-regulated learning variable decreases, the academic procrastination variable increases. Supported by Najla Syafiqah that there was a negative relationship between academic procrastination and self-regulated learning.

Ferrari et al. (1995) stated that the causal factors behind procrastination behavior include irrational thinking from procrastinators, namely assuming that a job or task must be done perfectly (Zabelina & Smanov, 2023; Zhang & Ma, 2019). Pressure is in the form of anxiety because the ability to do something will be assessed or evaluated while feeling confused about failure and difficulty taking action, or relying on other people's abilities to complete his tasks/assignment. Then, inattentive and unable to manage time well. Also, there is no sensitivity from the school environment and family toward students so they become procrastinators.

Accumulation of assignments is also a factor that often causes procrastination. A large number of assignments are collected from several lessons given at the same time or near time. Also, the assignments need to be completed immediately and not finished yet, but they have received new assignments from other lessons. Therefore, postponing one task/assignment will result in postponing in the next task/assignment.

CONCLUSION

Based on the findings, namely the relationship between math anxiety and self-regulated learning with students' academic procrastination in Mathematics subjects in class VIII SMPN 2 Alalak, concluded that: (1) The level of students' math anxiety in Mathematics in class VIII SMPN 2 Alalak is in the moderate category with a percentage of 62.90%; (2) The level of students' self-regulated learning in Mathematics in class VIII SMPN 2 Alalak is in the moderate category with a percentage of 54.84%; (3) The level of students' academic procrastination in Mathematics subjects in class VIII SMPN 2 Alalak is in the moderate category with a percentage of 75.81%; (4) There is a positive relationship between math anxiety and students' academic procrastination in Mathematics subjects in class VIII SMPN 2 Alalak; (5) There is a negative relationship between self-regulated learning and students' academic procrastination in Mathematics subjects in class VIII SMPN 2 Alalak.

This research can be used as a reference to other researchers in the field of mathematics education, especially in research on students' affective aspects. Further research on the math anxiety variable can be carried out by providing treatment to students aimed at reducing the student's level of math anxiety. Meanwhile, the self-regulated learning variable needs to be conducted for students who need indepen-

dence in their learning. Also, the academic procrastination variable often occurs in students, namely by postponing completing their final assignment or thesis.

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