



MATHEMATICAL CRITICAL THINKING SKILLS PROFILE REVIEWED FROM ACADEMIC PROCASTINATION

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Abstract

This research aims to describe students' mathematical critical thinking abilities in terms of the level of academic procrastination. The research method used is descriptive qualitative with data collection techniques through questionnaires, observation, interviews and documentation. The subjects of this research were students in class VIII A of SMP Muhammadiyah Larangan on straight line equations. Data analysis was carried out using triangulation, namely comparing data from various sources (questionnaires, interviews and observations) to obtain a more comprehensive understanding. The research results show that: 1) Students with high academic procrastination are unable to carry out interpretation, analysis, problem solving, evaluation, or inference; 2) Students with moderate academic procrastination are able to carry out interpretation and analysis, but are unable to carry out problem solving, evaluation and inference; 3) Students with low academic procrastination are able to carry out interpretation, analysis, problem solving, evaluation and inference well. The results of this study indicate that students' level of academic procrastination has a significant impact on their mathematical critical thinking abilities. Students with high procrastination tend to experience difficulties in interpreting, analyzing and solving problems, which indicates the need for more effective intervention in the learning process. Developing learning strategies that can reduce procrastination, such as implementing time management techniques, increasing motivation, and implementing active learning methods, is very important. Schools and educators can create an environment that supports the development of students' critical thinking skills, which in turn will improve their overall academic performance.

Keywords: Academic procrastination, Critical thinking skills, Mathematics.

INTRODUCTION

Mathematics is often referred to as the mother of science because of its enormous role in various disciplines. The role of mathematics has resulted in the increasing demands on students' mathematical abilities in the learning process (Anwar, 2018). The demands of this mathematical skills not only include the skills to calculate, but also the skills to reason logically and critically in solving problems (Fathani, 2016).

Critical thinking skills play an important role in daily life because they are related to the development of other thinking skills, such as in decision-making and problem solving (Hidayah et al., 2017). A person is said to think critically if a person is able to think logically, reflectively, systematically, and productively which can be applied when making considerations in making a decision so that mathematical thinking skills in students need to be trained, one of which is the skills to think critically (Yunita et al., 2018).

According to Saputra (2020), critical thinking skills are thinking skills that involve cognitive processes and reflective thinking about problems. In this context, critical thinking includes the activities of solving problems, analyzing assumptions, rationalizing, evaluating, conducting investigations, and making decisions. According to Hidayah et al. (2016) explained

that critical thinking is a disciplinary process of intellectual methods because it will lead a person to actively and skillfully understand, apply, analyze, synthesize and evaluate various information collected or obtained from experiences, observations, and reflections carried out. Critical thinking skills are one of the abilities that must be possessed by students in the learning process (Rahayu and Alyani, 2020). Mathematical critical thinking skills is a person's skills to solve or divide a whole concept into small parts, combine small parts of a concept into something new, be able to make and determine concepts, be able to conclude, and be able to evaluate and give judgments with certain criteria (Mursari, 2020).

In the learning process, in addition to mathematical skills, academic procrastination is also an important factor that needs to be considered. Academic procrastination is defined as the habit of procrastinating in carrying out school obligations (Nurdiawan et al., 2019). It often appears when students do not like the assignment given, so they prefer not to do it (Ilyas and Suryadi, 2019). In Ramadhani et al. (2020) stated that academic procrastination is a procrastination behavior in completing and collecting assignments within a set time period. This can cause emotional stress and negatively affect students' academic performance (Ami and Yuniartaq, 2020). This is in line with the results of Setiawan's (2015) research that students who have a tendency to procrastinate academic tasks tend to have difficulty completing work on time, which has a negative impact on students' understanding of the subject matter. Students' academic procrastination consists of procrastination of postponing schoolwork, laziness in completing schoolwork, not being able to manage time between learning and play, and students' mood (Permana, 2019). This is emphasized in the research of Ami and Yuniartaq (2020) that academic procrastination has several aspects, namely: (1) *Perceived time* is a person who does not collect tasks according to the set time, thinks more about the present than about things to come, and usually the person has a lazy personality. (2) *Intention-action* is a relationship between something desired and an action that can be illustrated with a student who has the desire to complete his task but does not have the time to do it. (3) *Emotional distress* is the emergence of a feeling of anxiety from within the student because he has not completed his assignment with a deadline that is almost up. (4) *Perceived skills* is a belief in oneself that he is able to complete his task independently, accompanied by feelings of anxiety, fear and self-blame.

Various approaches have been carried out to improve students' critical thinking skills, such as guided discovery models (Hidayah et al., 2016) and *problem-based learning* (Rusli et al., 2023). Research conducted by Gunawan et al. (2022) explains the importance of using teaching materials in the form of modules to help improve students' critical thinking skills. With the help of learning modules, a teacher can improve students' critical thinking in mathematics learning. However, there is a research gap that directly links academic procrastination and critical thinking skills, especially in the context of mathematics learning. Therefore, this study aims to describe the mathematical critical thinking skills of grade VIII students of Muhammadiyah Larangan Junior High School in the context of academic procrastination in the material of straight line equations. It is hoped that the results of this study can provide deeper insight into the influence of

procrastination on students' critical thinking skills, as well as provide recommendations for the development of more effective learning strategies.

RESEARCH METHODS

The type of research conducted by the researcher is qualitative descriptive research. Qualitative research is a research technique that uses narratives or words in explaining and describing the meaning of each particular social phenomenon, symptoms, and situation (Waruwu, 2024). In this study, it discusses the skills to think critically mathematically and procrastinate. This study aims to describe the skills to think critically mathematically, reviewed from the academic procrastination of Muhammadiyah Larangan Junior High School students.

This research was carried out in the odd semester of the 2024/2025 academic year at Muhammadiyah Larangan Junior High School, Brebes. The subjects of the study were 30 students of class VIII A. From this number, 3 students will be selected as samples based on the category of academic procrastination and critical thinking skills that have been determined. The instruments used in this study were academic procrastination questionnaires, critical thinking skills tests, and interview guidelines.

The selection and determination of research subjects is carried out after students fill out the academic procrastination questionnaire. Furthermore, each level of academic procrastination includes high, medium, and low. Each category is taken one subject with a *purposive sampling technique*. Each of the high, medium, and low categories was assigned a PAT, PAS, and PAR code. The following table 1 describes the grid of academic procrastination instruments:

Table 1. Academic Procastination Indicators

No.	Indicators	Sub Indicator	No. Item	
			Positive	Negative
1.	<i>Perceived time</i>	a. Procrastination	1	13
		b. Failure to meet deadlines	17	9
		c. Have lazy behavior	21	5
2.	<i>Intention-action</i>	a. Not having time to work on tasks	18	22
		b. Lack of time management	10	14
		c. Lack of personal initiative	2	6
3.	<i>Emotional distress</i>	a. Having feelings of anxiety when procrastinating tasks	3, 19	24
		b. Lack of focus on what will be done	23	7
		c. Feel calm when there is still plenty of time	11	15

		to do tasks		
4.	<i>Perceived skills</i>	a. Fear of failure	4	8
		b. Lack of confidence in one's abilities	20	12, 16
Sum			12	12

(Ami dan Yuniantaq, 2020)

Furthermore, to collect data on mathematical critical thinking skills, it is a written test of critical thinking skills on straight-line equation materials with indicators of mathematical critical thinking skills including interpretation, analysis, problem solving, evaluation, and inference.

In this study, unstructured interviews were used to ascertain the results of students' work in the mathematical critical thinking skills test. In addition, this stage also aims to delve further into the ways and patterns of students think critically mathematically, especially when they complete the given test. The interview grid used is described in table 2.

Table 2. Interview Guidelines

Aspects	Component	Item Number
Critical Thinking	Straight Line Equation	1, 2, 3, 4, 5, 6, 7, 8, 9
Academic procrastination	<i>2.1 Level</i>	10, 11, 12
	<i>2.2 Strength</i>	13, 14, 15, 16
	<i>2.3 Generality</i>	17, 18, 19, 20, 21

(Aziz et al., 2023)

This research process begins by determining the class that will be used as a random research subject. The research subjects of class VIII-A, then students in the class were given an academic procrastination questionnaire. The scores obtained are converted and categorized into high, medium, and low categories. Table 3 describes the criteria for grouping student academic procrastination questionnaires.

Table 3. Criteria for Grouping Academic Procastination Questionnaire

Formula	Category
$x \geq \bar{x} + SD$	High
$\bar{x} - SD \leq x < \bar{x} + SD$	Medium
$x < \bar{x} - SD$	Low

The analysis of research data used includes data reduction, data presentation, and conclusion drawn. The research data was selected according to the main variables of critical thinking skills. The corresponding data is then presented in the form of images and tables to clarify the research findings. The last stage was to provide a conclusion about the profile of students' critical thinking skills based on academic procrastination.

RESULTS AND DISCUSSION

The results of the academic research grouping carried out on 30 students in the class that were the subject of the research are presented in table 4 below.

Table 4. Recapitulation of the Academic Procastination Questionnaire

Category	Sum	Presentase (%)	Subject Code
High	8	26,67%	PAT
Medium	16	53,33%	PAS
Low	6	20%	PAR

Based on the table, it can be seen that most students have a moderate level of academic procastination. This can be seen from the results of filling out the questionnaire given in the class. The high procastination group had a percentage of 26.67% and was given a PAT code, the medium academic procastination group 53.33% was given a PAS code, and the low academic procastination group of 20% was given a PAR code. Furthermore, the three subjects were analyzed about the critical thinking process in solving math problems. The following is an analysis of each subject.

Category of Higher Academic Procastination Students

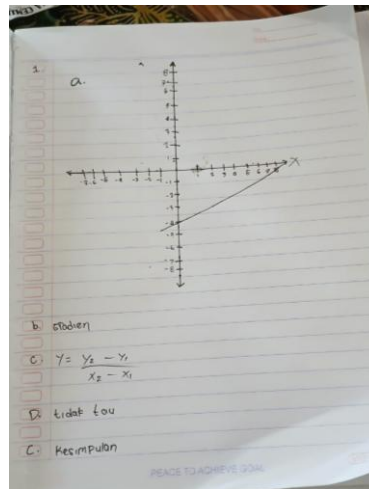


Figure 1. PAT Student Work Results

Based on figure 1, students are expected to be able to interpret the questions given. Students are asked to draw a sketch of point A and point B on the Cartesian plane. However, the sketches produced by the students are not suitable, because the point (x,y) given in the question are (4,8) , where (x = -4) and (y = 8). At point b, students are not able to do problem analysis well. They only list the word "gradient" without further explanation. Through interviews, it was revealed that students did not understand how to look for gradients, which showed a gap in understanding the concept.

Furthermore, students do not do proper problem-solving. The subject cannot answer the question with the correct formula. When interviewed, students explained that they did not understand the instructions given, so they only wrote random formulas. Students with high levels of academic procrastination also show difficulties in conducting evaluations and inferences. On points d and e, they only give makeshift answers. In the interview, students explain that they don't understand the intent of the question, which leads to incorrect answers. Individuals who experience academic anxiety tend to be higher in procrastination behaviors, the inskills to manage anxiety can hinder a student's skills to complete assignments on time (Sirois, 2023). Furthermore, Rusli et al. (2023) in their research on the skills to think critically with academic procrastination explained that the procrastination carried out by students occurred because they were constrained by a lack of understanding of the task at hand so that students were unable to answer problems appropriately. In line with Sirois (2014) who shows that academic anxiety can contribute to procrastination behavior. In the context of education, many students feel pressured by high academic demands, which in turn can hinder their skills to complete assignments on time. Therefore, it is important for educational institutions to provide psychological support and effective stress management strategies to help students cope with their anxiety and improve self-regulation.

Category of Medium Academic Procrastination Students

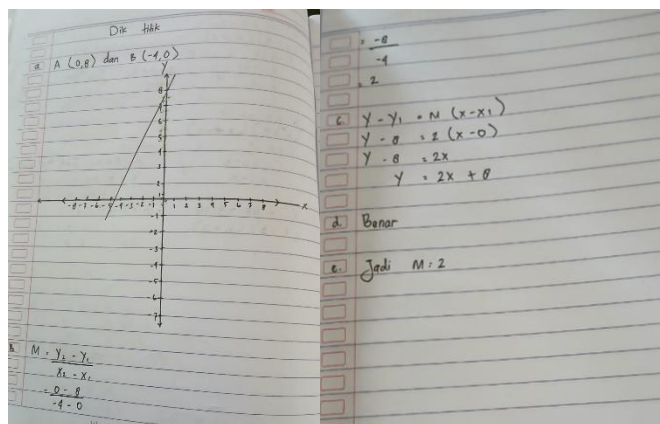


Figure 2. PAS Student Work Results

Based on figure 2, subjects with a level of academic procrastination are showing the skills to interpret. The subject successfully drew a sketch of a point into the Cartesian plane correctly. In addition, the subject is able to analyze the problem by looking for a gradient using the right mathematical model. The subject also shows the skills to solve problems by solving problems and finding the line equations of the two points contained in the problem. However, there are weaknesses in evaluation capabilities. The subject simply answered "correctly" without providing any further explanation. When interviewed, it was revealed that they had difficulty in evaluating the problems given, so they only gave simple answers.

In addition, it is not able to make inferences. In the interview, the subjects explained that they had difficulty drawing conclusions from the problem, which resulted in them writing

answers carelessly, such as " $m = 2$ ", without a clear understanding. Subjects who procrastinate more often tend to have lower critical thinking skills, which impacts their skills to solve mathematical problems (Sirois, 2014). This is strengthened by the results of Wijaya (2024) research that low procrastination makes students accustomed to practicing to solve math problems and when facing new application problems related to daily life, they can solve them well. This study shows a significant relationship between academic procrastination and mathematical critical thinking skills. Students who experience procrastination tend to have lower performance in critical thinking and problem-solving.

Category of Low Academic Procastination Students

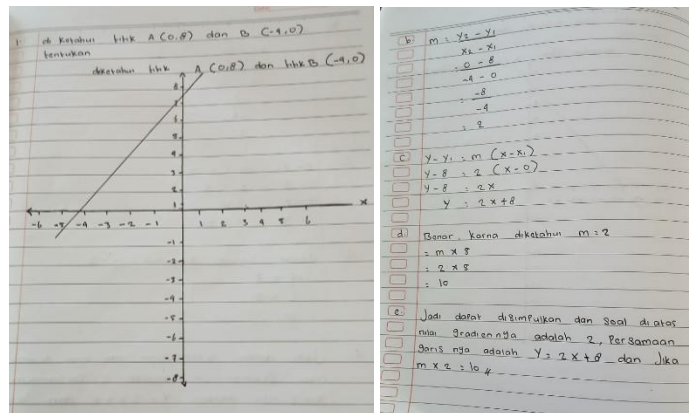


Figure 3. PAR Student Work Results

Based on Figure 3, subjects with a low level of academic procrastination show good skills to interpret. The subject can draw a two-point sketch into the Cartesian plane correctly. Able to perform analysis by relating problems into the right formula to calculate gradients. In problem solving, the subject shows good skills by solving problems using the right formula to find the equation of a straight line. In addition, it can be evaluated by providing the right explanation. For example, explaining that if the gradient is multiplied by 2, the result is 10, because it is known that $m = 2$. Thus, $m \times 2 = 10$. Subjects are also able to infer well. When interviewed, students explained that in drawing conclusions, they rewrote the steps that had been completed, namely calculating gradients, looking for straight line equations, and evaluating the problem. When it is known that the gradient is multiplied by 2, the subject is able to conclude that the result is 10, stating that the statement in the problem is true.

Not only is the subject able to correctly draw a two-point sketch into the Cartesian plane, but he can also analyze the problem by relating it to the right formula for calculating gradients. The results of Wijaya (2024) research explained that low academic procrastination shows that students who always do all tasks and prepare for daily tests can develop their critical thinking skills well because they have been trained in daily routines. Low procrastination makes students accustomed to practicing to solve math problems and when facing new application problems related to daily life, they can solve them well. Therefore, it can be concluded that low academic procrastination contributes positively to students' skills to solve math problems. This research

makes an important contribution in understanding the factors that affect students' overall academic achievement.

CONCLUSION

This study found that students' academic procrastination levels had a significant impact on their skills to understand and solve math problems, namely 1) Students with high academic procrastination experienced significant difficulties in all aspects of math problem-solving. Students in this category are not able to interpret, analyze, solve problems, evaluate, or inference. This indicates significant difficulties in understanding and solving math problems, 2) Students with medium academic procrastination are capable in some aspects, but deficient in evaluation and inference, and 3) Students with low academic procrastination show good skills in all aspects. Students in this category are able to perform interpretation, analysis, problem-solving, evaluation, and inference well. This shows that students with lower levels of procrastination have a better understanding and skills to apply mathematical concepts effectively.

Overall, this study shows that students' level of academic procrastination is related to the skills to understand and solve mathematical problems. This study was limited to students at a single institution and did not take into account external factors that might affect procrastination and academic skills. Further research can be done by involving various institutions or by examining other factors that affect academic procrastination and student learning outcomes. Therefore, it is important to develop learning strategies that can reduce academic procrastination and improve students' math skills.

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