An Information Technology-Based Learning to Reduce Math Anxiety in Solving Problem

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An Information Technology-Based Learning to Reduce Math Anxiety in Solving Problem

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Abstract*: Students who experience anxiety can influence how these students to think, reason, and do actions to solve problems in mathematics subjects, especially about triangles. The solution used to reduce the level of mathematics anxiety of students is to use an information technology-based learning. The purpose of this study is to describe whether information technology-based learning and communication can reduce mathematics anxiety of grade 7 students. This classroom action research consists of two cycles with the initial stage of setting targets for achieving indicators of research success. The results showed that the average level of anxiety of students classified as high, namely 92, then decreased to 82 in the first and 70 cycles at the end of the second cycle. While the percentage of implementation of information technology-based learning at the end of the first cycle was 80.25% and at the end of the second cycle was 91%.

***Keywords*: information technology-based learning, math anxiety, problem solving.**

I. INTRODUCTION

Mathematics is one of the subjects that makes students feel anxious. The anxiety reaction indicated by fear, tension, concentration easily disturbed, wanting to get out of class, stress, and others [1]. This reaction usually only appears at the beginning to the end of mathematics learning. This mathematical anxiety is an emotional response syndrome to mathematics and arithmetic [2]. Many students show a terse response when faced with solving mathematical problems. Previous research also indicates that a sense of mathematical anxiety is felt especially in middle school students [3], [4][5].

Stages of problem-solving in mathematics learning can train students' cognitive abilities to think and process existing information associated with new information encountered. Problem-solving on mathematical tasks provides a challenge for students to improve understanding and intellectual development [6]. In solving problems, students learn to determine what is known, ask questions, make mathematical models, and describe the steps to completion.

Evidence that shows students' anxiety questionnaire during learning shows that the initial conditions before the study showed high criteria with the most significant percentage.

Table- I: First Condition of mathematics anxiety

Interval	Criterion	First Condition (%)
X>100	Very high	40
83.33<X≤100	High	28
66.67<X≤83.37	Medium	16
50<X≤66.67	Low	8
X≤50	Very Low	8

The table shows that the initial conditions indicate student anxiety at 92% included in the high criteria.

Often in the face of mathematical problems, students still feel difficulties and anxiety cannot solve the math problem. The students need to be a learning approach that can reduce students' stress. With the development of information technology[7][8], the use of information technology-based learning, such as the use of multimedia in education can overcome mathematical anxiety [9]. The use of information technology in learning such as e-learning, learning videos, chatrooms[10], and others can attract students' attention so that it can reduce math anxiety.

II. METHODS

The study aims to describe whether an information technology-based learning approach can reduce mathematics anxiety in junior high school seventh-grade students in solving problems. This type of research uses classroom action research that has a cycle of planning, implementation, observation, and reflection [11]. If the research cycle does not meet the specified indicators, the period will repeat itself.

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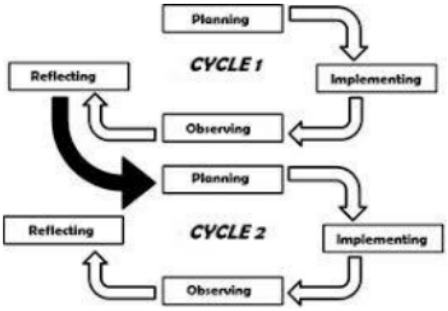

Fig. 1. Classroom action research cycles

The instrument used is a test to assess student mastery learning and mathematics anxiety questionnaire filled in by students at the beginning and end of knowledge. The test is an essay test that contains arithmetic problem-solving questions and is done online using a computer in the laboratory. Data collected from test results that show student achievement and student completeness in learning and from questionnaire results that indicate the level of student anxiety from the initial conditions and each cycle. Also, data obtained from the results of the implementation of information technology-based learning.

III. RESULT AND DISCUSSION

Data from the analysis of the implementation of learning by teachers in the first cycle and the second cycle shown in the following table.

Table- II: Teachers learning implementation on cycle I and II

Cycle	Meeting	Average learning implementation by teacher(%)	Category
Cycle I	First	70	Good
	Second	83	Excellent
	Third	80.25	Good
Cycle II	First	90	Excellent
	Second	91	Excellent

From the table shows that in the first cycle, not all meetings have an outstanding category on the implementation of learning. This category is because several learning steps do not show the activities of teachers and students. Whereas in the second cycle, improvements have made, so that the implementation of learning includes a select category. Table 2 is the result of the execution of learning by students.

Table- III: Students learning implementation on cycle I and II

Cycle	Meeting	Average learning implementation by students(%)	Category
Cycle I	First	70	Good
	Second	73	Good
	Third	72	Good
Cycle II	First	80	Excellent
	Second	85	Excellent

From table 3 shows that the implementation of learning by students also experienced an increase from the Good category in the first cycle and the first category in Cycle II.

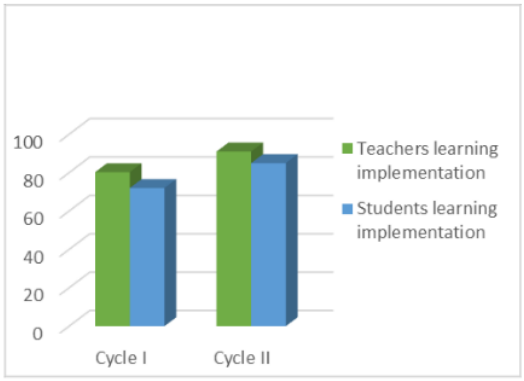

Fig. 2. Graphic implementation learning by teacher and students on cycle I and II

The graph shows an increase in the implementation of learning activities from cycle I to cycle II, while the decrease in mathematics anxiety levels shown in tables IV and tables V.

Table- IV: First condition before treatment

Variabel	Interval	Criterion	First condition (%)	Target
Anxiety	X>100	Very High	40	8
	83.33<X≤100	High	28	8
	66.67<X≤83.37	Medium	16	16
	50<X≤66.67	Low	8	40
	X≤50	Very Low	8	28
	Average		92(high)	Medium
Cognitive ability	Completeness ≥ 75%	KKM achieved	0	75
Learning process	Implementation ≥ 80%	Learning succed		81

This table shows about anxiety criterion with the highest was 40%, cognitive ability achieves, and learning process succeed. All of the students fulfill the minimal criterion of the class.

Table- V: Condition after cycle I and II

Variabel	Interval	Criterion	After cycle I (%)	After cycle II (%)
Anxiety	X>100	Very High	24	8
	83.33<X≤100	High	20	16
	66.67<X≤83.37	Medium	32	44
	50<X≤66.67	Low	8	24
	X≤50	Very Low	16	8
	Average		82(High)	70(medium)
Cognitive ability	Completeness ≥ 75%	KKM achieved	85,25	93,75
Learning process	Implementation ≥ 80%	Learning succed	80,25	91

The anxiety of students decreases the criteria from a high level to moderate according to previous research that uses multimedia learning based on information technology [12].

Initially, they felt stressful and anxious to solve mathematical problems because they were confused, did not understand but did not dare to ask. Finally, with the existence of videos and chatrooms that made it possible to keep learning even though passivity can also reduce math anxiety [13].

IV. CONCLUSION

The results showed that the information technology-based learning approach could reduce mathematical anxiety in solving problems. It revealed from the initial conditions, including the criteria of high 92, then dropped to 82 in the first cycle and became a moderate level of 70 in the second cycle. This criterion is caused by students who have not shown tension and fear at the beginning of learning and do not want to leave the classroom. The students not disrupted their concentration because they are busy using computers to view learning videos. They enjoy discussing with friends and teachers using chatrooms that do not need to be face-to-face anymore. Also, they guided in solving problems that have been given a video tutorial from the beginning to identify, model, and step settlement.

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