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Effectiveness of Problem-Based Learning: Integrating Emotional Intelligence in Enhancing Mathematics Learning Outcome of Students in SMA Negeri 3 Palopo

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Abstract

This study aims to investigate the effectiveness of problem-based learning integrated with emotional intelligence to enhance students' mathematics learning outcome. This research was a pre-experimental study with and the population was all tenth-grade students of natural science classes. The researcher chose one class as the experimental unit which was the class of MIPA3 as the sample of the study by simple random sampling. The design used was *the One-Group Pretest-Posttest Design*. The data analysis techniques used in the research were the analysis of descriptive statistics and inferential statistical analysis. The problem-based learning integrating emotional quotient referred to is mathematics learning that integrated emotional intelligence in its learning process. The integration encompassed all learning activities since the learning activities began as well as heterogeneous grouping of students in terms of their emotional intelligence. The result showed that: (1) students' classical completeness was 97,14% with an average of 85,69; (2) students' activity was in the category of active; (3) students' response tended to be positive; and (4) problem-based learning integrated with emotional quotient effectively enhanced the mathematics learning outcome of students in SMA Negeri 3 Palopo.

Keywords: *Effectiveness, problem-based learning, emotional intelligence, learning outcomes*

1. Background

Mathematics is one of the science that must be learned in every level of education. A mathematical object is abstract so it is difficult for students to understand. Its' abstractness and inappropriate learning approach, become the factors contributing to students' learning difficulties.

It must be recognized that the usual mathematics learning in school level still does not maximizes the goals of mathematics education. The abstractness of mathematical objects and improper learning approach contributes to students' difficulties in studying mathematics.

Soedjadi (2001) said that mathematics education should pay attention to two objectives which are formal goals and material goals. The former are structuring of reason and attitude formation while the latter are applied mathematics and mathematical skills. It can be concluded that through mathematics learning, students are expected to improve their

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thinking skills mathematically, apply mathematics to solve various problems faced, and build a good character. Thus, ways or strategies, methods, and models of learning should be considered to achieve the goals. One of the appropriate models is problem-based learning.

Problem-based learning is learning designed to facilitate students in finding the solution of the problem given (Sariningsih, & Purwasih, 2017). Arends (Sumartini, 2016) stated that problem-based learning was specially designed to support students in enhancing their thinking skill, problem-solving skill, and intellectual skill. According to Tanjung and Nababan (2018), the implementation of the learning encourage students to not only thinking concretely, but also promote students' thinking about abstract and complex ideas.

Ginanjar (Syawahid, 2013) asserts that the education system in Indonesia overemphasize on academic values across the level of education and rarely do we find the education of emotional intelligence. As a result, students' skills to recognize emotion, control emotion, make use of emotion and empathy, and build relation are rarely developed during the learning process. Ilyas, Ma'rufi, Fitriani, & Salwah, (2018) convey that emotional intelligence is students' ability to create innovation that synergizes in teamwork to achieve organization or group goals. A person's emotional intelligence involves skill in self-management and so forth. Unlike intellectual quotient that tends to be stable, emotional quotient could be taught, trained, and enhanced in every stage of children's development (Ilyas, 2014).

This is where the researcher thought that mathematics learning should not only focus on the quality development of intellectual quotient but also synergizes it with emotional quotient. Therefore the research title raised is "Effectiveness of Problem-based Learning: Integrating Emotional Intelligence to Enhance Mathematics Learning Outcome of Students in SMA Negeri 3 Palopo". Based on the background of the study, the research questions are:

1) How is mathematics learning outcome of students in the class of MIPA3 of tenth grade in SMA Negeri 3 Palopo after taught by problem-based learning integrated with emotional intelligence?
2) How is students' activity during the learning?
3) How is students' response after taught by implementing the learning?
4) Is the problem-based learning integrated with emotional quotient effective to be implemented in the class of MIPA3 of tenth grade in SMA Negeri 3 Palopo?

The objectives of the study are to investigate: (1) students' learning outcome before and after the implementation of problem-based learning integrated with emotional intelligence in the class of MIPA3 of tenth grade in SMA Negeri 3 Palopo; (2) students' activity during the implementation of the learning; (3) students' response toward the learning; and (4) whether the learning is effectively implemented in the classroom.

2. Methods

This study was categorized as pre-experiment research that only needed one unit of the experiment to find out students' learning outcome whereas students' activity and students' response were additional data or complementary data regarding the implementation of problem-based learning integrated with emotional intelligence.

The population of the research was all tenth grade (X) students in SMA Negeri 3 Palopo in the academic year of 2018/2019 while the sample of the study was randomly selected as an experimental unit that will be given the treatment of the problem-based learning.

Variable is a concept having various values. There are two kinds of the variable used in the study consisting of independent and dependent variables. The former was problem-based learning that integrated emotional quotient while the latter was learning effectiveness comprising students' learning outcome, students' activity, and students' response.

The data collection tools employed in the study were: 1) questionnaire of emotional intelligence, b) observation result of students' activity, c) questionnaire of students' response, and d) test sheet of learning outcome.

The study was planned by using the design of one-group pretest-posttest. In the study, the class chosen as the experimental unit was one natural science class (MIPA) which was class of X MIPA3 that will be given a treatment of problem-based learning which integrated emotional quotient on the topic of Trigonometry.

Table 1. Research Design

Class	Pre-test	Treatment	Post-test
R	O_1	T	O_2

Source : Sugiyono (2012)

There are several ways to collect data which were:

1. Data regarding students' emotional quotient were obtained by using a questionnaire of emotional intelligence comprised 51 statements that were divided into 43 items of positive statements and 8 items of negative statements.
2. Data of students' activity were collected through the use of an observation sheet of their activity during learning. Its data were collected by observing the students during the learning activities.
3. Data about students' response toward the learning were obtained by utilizing a questionnaire of their response. The data were collected after students' participation in the test of learning outcome.
4. Data of students' learning outcome were collected by using the test of students' learning outcome. The test was administered to students at the end of the last session after all the material was taught.

Data from the findings of the research were analyzed by utilizing descriptive statistics. Then, to investigate the learning effectiveness in the aspect activity, response, and students' learning outcome as formulated in the hypothesis, the data regarding students' learning outcome were analyzed by employing t-test and normalized gain..

3. Results and Discussion

Findings from Descriptive Analysis

Result of Data Analysis on Students' Activities

Observation of students' activity during the learning activities employed observation sheet and was carried out by observation since the beginning to the end of the learning activities. Data of observation result revealed that students' activity was categorized as active in all aspect of observation in every lesson.

Result of Data Analysis on Students' Response

From the response questionnaire filled by 35 students after participating in the learning on the topic of Trigonometry, the following were the results of the analysis:

1) 98,04% of students were enjoying the learning components while the rest stated their displeasure toward the components.
2) There were 93,28% students considering the learning components as new while the rest (6,72%) conveyed that the components were not novelties.
3) 100% of students were interested to participate in the next problem-based learning integrated with emotional intelligence.

4) 89,22% of students were saying that they could understand the language used in all components of learning and leaving the rest (10,78%) that still faced difficulties in understanding the language.

5) 93,24% of students were interested in the appearance of the learning components used.

Result of Data Analysis on Students' Learning Outcomes

In this study, assessment on learning outcomes was carried out by written test and was given once after all the lesson was finished. Result of quantitative descriptive analysis of student's mastery in mathematics (learning outcomes) after the treatment was shown in the following Table 2.

Table 2. Descriptive Statistics of the score of students' mathematics learning outcome in tenth grade at the class of $MIPA_3$ in SMA Negeri 3 Palopo

Variables	Statistical Value
Research Subject	35,00
Ideal Score	100,00
Average	85,69
Standard Deviation	8,14
Variance	66,22
Range	35,00
Maximum	95,00
Minimum	70,00
Number of students passing the criteria	34,00
Number of students fail to pass	1,00

Table 2 showed that the mathematics learning outcome of students in the class of MIPA3 of tenth grade in SMA Negeri 3 Palopo had an average score of 85,69 with the ideal score of 100 and standard deviation of 8,07. The maximum score obtained by students was 95 while the minimum one was 70,00 producing a score range of 35,00. Additionally, 34 students were passing the minimum criteria which meant that the classical completeness in the study was 97,14%.

Findings from Inferential Analysis

Normality Test

To investigate whether students' learning outcome had a normal distribution, analysis of normality test was employed by using SPSS and the following were the result of the analysis

Table 3. Result of Normality Test of Students' Learning Outcome

		Pre-test	*Post-test*
N		35	35
Normal Parameters[a,b]	Mean	45,86	85.69
	Std. Deviation	20,81	8.14
Most Extreme Differences	Absolute	.112	.220
	Positive	.112	.145
	Negative	-.109	-.220
Kolmogorov-Smirnov Z		.665	1.302
Asymp. Sig. (2-tailed)		.768	.067

Based on Table 3, the analysis result of the normality test on students' learning outcome showed by *Asymp. Sig. (2-tailed)* discovered that the p-value of pretest had a value of 0,768 ($p \geq 0,05$) and the p-value of the posttest was 0,067 ($p \geq 0,05$). Thus, it can be concluded that the value of pretest and posttest had a normal distribution. It indicated that the sample of the study is from a normally distributed population.

Hypothesis Testing

Result of hypothesis testing was shown in Table 4.

Table 4. *One-Sample t-Test*

Test Value = 75						
	T	*Df*	*Sig. (2-tailed)*	*Mean Difference*	*95% Confidence Interval of the Difference*	
					Lower	*Upper*
Learning Outcome *(Post-Test)*	7.768	34	.000	10.68571	7.8903	13.4811

Table 4 revealed that the p *Sig. (2-tailed)* has a value of 0,000 < 0,05 showing that the average of normalized gain in the class taught by problem-based learning integrated with emotional intelligence is more than 0,3. It meant that H_0 was rejected and H_1 was accepted and indicated that the normalized gain is more than 0,3 which was in the category of average or medium.

Based on the data of research findings, it can be concluded that this study (the learning) satisfied the criteria and the attainment of learning effectiveness. For more details, it was shown in the following Table 5.

Table 5. Criteria and Achievement in Effectiveness

No.	Learning Model	Criteria	Achievement	Conclusion
1	Emotional Quotient Integrated Problem-based Learning	Classical Completeness	Satisfied	Effective
2		Students' Activity	Active	
3		Students' Response	Positive	

4. Conclusion

Based on the result and discussion, the conclusions of the study are:

1. The score of students' mathematics learning outcome in the class of X $MIPA_3$ SMA Negeri 3 Palopo has an average of 85,69 with the classical completeness of 97,14%.
2. Students' activity in all aspect observed in every lesson is in the category of active.
3. Students' response to problem-based learning integrated with emotional intelligence tends to be positive.
4. Problem-based learning integrated with emotional quotient effectively increase students' mathematics' learning outcome in the class of X $MIPA_3$ SMA Negeri 3 Palopo.

5. Citation and References

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