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## IMPROVING THE STUDENTS' PROBLEM-SOLVING ABILITIES THROUGH THE DEVELOPMENT OF LEARNING MOTIVATION

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### Abstract:

This study aimed to explore the effect of learning motivation on students' problem-solving abilities. This research was quantitative research with an experimental method. The research design used was a within-group with a repeated measure type. The subjects were the students of State Islamic University of Antasari Banjarmasin, consisting of 138 people. The research instrument used was a test. The data were analyzed by repeated measures using the SPSS version 25 program with Tests of Within-Subjects analysis. Based on the analysis data, it showed that the Sphericity Assumed value was Sig. 0.00, which was less than 0.05. It meant that Ho was rejected and Ha was accepted. In other words, there was clear evidence that the treatment results had a significant effect on the development of problem-solving abilities during treatment. Therefore, the results indicated that one of the efforts to improve students' problem-solving skills was to develop student learning motivation.

### Abstrak:

Tujuan penelitian ini adalah untuk mengeksplorasi pengaruh motivasi belajar terhadap kemampuan pemecahan masalah mahasiswa. Penelitian ini merupakan penelitian kuantitatif dengan metode eksperimen. Adapun desain penelitian yang digunakan adalah jenis within-group or individual design dengan tipe repeated measures. Subjek pada penelitian ini adalah mahasiswa pada perguruan tinggi Universitas Islam Negeri Antasari Banjarmasin dengan total sampel sejumlah 138 orang. Instrumen penelitian menggunakan tes. Data dianalisis dengan repeated measures dalam program SPSS versi 25 dengan analisis Tests of Within-Subjects. Berdasarkan hasil analisis, diketahui bahwa nilai Sphericity Assumed adalah sig. 0,00 lebih kecil dari 0,05, maka Ho ditolak dan Ha diterima, atau dengan kata lain terdapat bukti yang jelas bahwa hasil perlakuan berpengaruh signifikan terhadap perkembangan kemampuan pemecahan masalah selama perlakuan. Hasil penelitian menunjukkan bahwa salah satu upaya untuk meningkatkan kemampuan pemecahan masalah mahasiswa adalah dengan mengembangkan motivasi belajar mahasiswa.

### Keywords:

Development, Learning, Motivation, Problem-Solving

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## INTRODUCTION

Higher education plays a very important role in developing and building the quality of a nation's generation. The provision of higher education quality is a long-term investment. However, to be able to achieve the goals of this education is not easy. It needs various factors. One of them is lecturers. They are required to be more creative and find alternative solutions to problems for students, especially in the learning process carried out in universities. As the agents of change, lecturers must contribute to creating a quality and highly competitive generation.

Various problems that demand solutions always come to students, ranging from simple to the most complex ones. Students are often faced with difficult things in solving problems, and sometimes solutions cannot be obtained immediately. Problems usually contain something that encourages students to solve them but not directly students can solve them. If a student has a problem and can immediately know how to solve it correctly, he/she can be said to have succeeded in solving it.

Students who are not prepared to face problems feel depressed and overshadowed by increasing problems. Muslim (2020) expressed that students who are not ready to face problems feel pressured and overshadowed by increasing problems can even be considered academic stress. This condition is the form of physical, mental, or emotional disorders caused by a mismatch between environmental demands and existing resources. Students who have those disorders are increasingly burdened with various pressures and demands at school. Academic stress is a response that arises because there are too many demands and tasks that students must do. Sometimes students make wrong decisions or avoid the problems they face. The problem is essentially the gap between reality and what is expected. This gap is manifested in the form of complaints and worries. To develop students' ability in problem-solving, what needs to be improved is the students' motivation to solve the problems they face.

Problem-solving ability is one of the goals or competencies to be achieved in learning. It is an important learning process because problem-solving abilities can generally be transferred to solve other problems. Problem-solving involves some information and getting a solution using that information.

According to Wene & Oemar (1980) solving a problem is the interaction between stimulus and response and a relationship between the two directions of learning and the environment. The environment provides input to students in the form of help problems, while the nervous system of the brain functions to interpret this effectively so that the problems faced can be investigated, assessed, analyzed, and sought solutions properly.

Several researchers' conducted studies relating to the students' problem-solving. One of them is Nuzliah (2016) who found that the students' problem-solving in learning is known that, as a whole, it is in the low category with 56.24 of the average score. In addition, Dewi (2015) found the students' problem-solving ability in the Guidance and Counseling study program at Sriwijaya University were low (41%), moderate (38.1%), and very high (14.3%) categories. Furthermore, Prihatina, Latifah, & Johan (2012) researched adolescent problem-solving strategies in various learning models and

showed that accelerated class students who used problem-solving in general were in the moderate category with 30.8%. Based on these previous researches, it could be understood that when facing problems, students had not been able to find and overcome the problems that were being experienced. This situation could be due to many factors that affected the problem-solving process. According to Rakhmat & Surjaman (1999), motivation was one factor that influenced problem-solving. It was said that motivation greatly influenced the problem-solving process. In addition, Ellis (1998) also stated:

*A person can bring a particular level of motivation to a problem-solving task, and the task itself may induce some motivational state in the person. These motivational states can, in turn, influence the efficiency of problem-solving. As the degree of motivation increases, problem-solving efficiency increases up to some optimal points, beyond which increases in motivation reduce problem-solving efficiency.*

Motivation can affect the efficiency of problem-solving. It is more precise to increase motivation which results in accuracy in problem-solving. A person also can increase motivation for problem-solving. Therefore, this study aimed to Improve Students' Problem-Solving Ability Through Learning Motivation Development.

This study aimed to improve students' problem-solving abilities by implementing a learning motivation development program. The results of this study were expected to contribute significantly both theoretically and practically to lecturers and higher education institutions in motivating students to face and solve their problems through a learning motivation development model.

## RESEARCH METHOD

This research was a quantitative study examining the effect of developing learning motivation on students' problem-solving abilities. Based on the stages to be carried out, the overall design used in this study was an experimental method. This method provides the most rigorous examination of any design in quantitative research. The independent variable in this study was the development of learning motivation, and the dependent variable was an increase in problem-solving abilities. The research design used was the within-group or individual design with repeated measures type Creswell (2008). The subjects of this study were 460 students at Antasari State Islamic University, Banjarmasin. The researchers then selected 30% of the subjects using a random sampling technique as a sample of this research. The sample selected was 138 students. The research instrument was a test. Data were analyzed using repeated measures through SPSS program version 25 with Tests of Within-Subjects analysis. The following table shows the pattern of conducting experimental research used.

**Table 1.** Research Design

Select participants for group	Measure or Observation	Experimental Treatment # 1	Measure or Observation	Experimenta l Treatment # 2	Measure or Observation

## RESULTS AND DISCUSSION

### The Effect of Treatment on the Development of Problem-Solving Ability

The researchers used repeated measures analysis through the SPSS version 25 program to find the effect of treatment on the development of problem-solving ability.

**Table 2.** Value of Repeated Measures

Mauchly's Test of Sphericity <sup>a</sup>							
Measure: Kemampuan_Pemecahan_Masalah							
Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Greenhouse-Geisser	Epsilon <sup>b</sup>	
						Huynh-Feldt	Lower-bound
Pengamatan	,983	2,373	2	,305	,983	,997	,500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept  
Within Subjects Design: Pengamatan

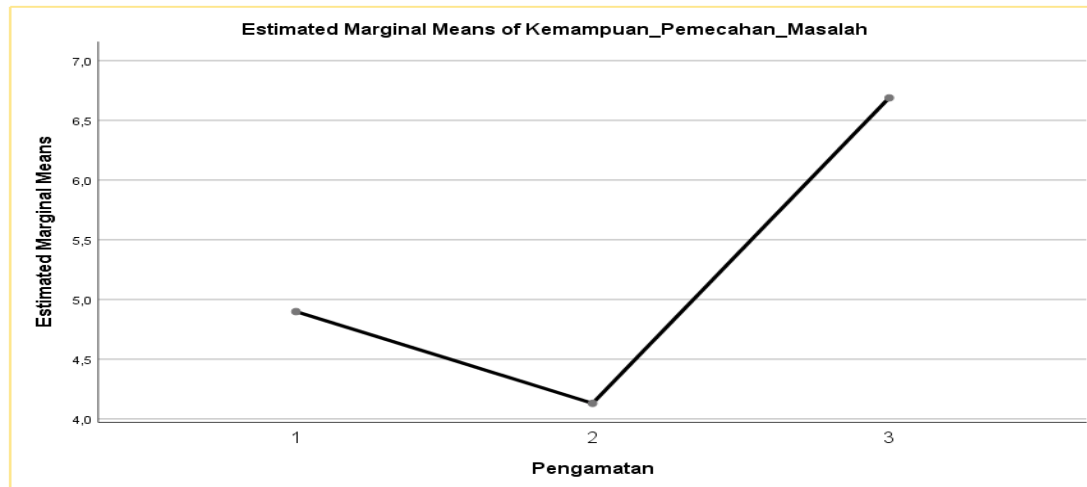
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Based on Mauchly's Test of Sphericity table as a requirement to continue to the Sphericity Assumed test, the Sig. found was  $0.305 > 0.05$ . It could be concluded that this research data fulfilled the variance equality requirements so that the repeated measure value could refer to the Sphericity Assumed value.

**Table 3.** Tests of Within-Subjects

Tests of Within-Subjects Effects						
Measure: Kemampuan_Pemecahan_Masalah						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Pengamatan	Sphericity Assumed	475,493	2	237,746	248,155	,000
	Greenhouse-Geisser	475,493	1,966	241,859	248,155	,000
	Huynh-Feldt	475,493	1,994	238,419	248,155	,000
	Lower-bound	475,493	1,000	475,493	248,155	,000
Error(Pengamatan)	Sphericity Assumed	262,507	274	,958		
	Greenhouse-Geisser	262,507	269,341	,975		
	Huynh-Feldt	262,507	273,228	,961		
	Lower-bound	262,507	137,000	1,916		

Based on the Tests of Within-Subjects Contrasts table, the value of Sphericity Assumed was Sig. 0.00, which was less than 0.05. It meant that  $H_0$  was rejected and  $H_a$  was accepted. In other words, there was clear evidence that the treatment results significantly influenced the development of problem-solving abilities during treatment. The value could also be seen from the plot of the average score from the first, second, and third observations as follows:



**Figure 1.** Value of Plot Repeated Measures

**The Partial Effects of Learning Motivation, Initial Problem-Solving Ability (Pre-test), the First Treatment in Week 2, and the Second Treatment in Week 3 (Post-Test) on Students' Grade Point Average (GPA) Achievement**

The researchers analyzed multiple linear regression using the SPSS version 25 program. The analysis result shows as follows:

**Table 4.** Summary of Linear Regression Analysis

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
						F Change	df1	df2	
1	,309 <sup>a</sup>	,095	,068	,42137	,095	3,508	4	133	,009

a. Predictors: (Constant), Kemampuan Pemecahan Masalah3, Motivasi Belajar , Kemampuan Pemecahan Masalah1, Kemampuan Pemecahan Masalah2

**Table 5.** ANOVA of Linear Regression Analysis

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2,492	4	,623	3,508	,009 <sup>b</sup>
	Residual	23,614	133	,178		
	Total	26,106	137			

a. Dependent Variable: Indeks Prestasi Kumulatif  
b. Predictors: (Constant), Kemampuan Pemecahan Masalah3, Motivasi Belajar , Kemampuan Pemecahan Masalah1, Kemampuan Pemecahan Masalah2

### Simultaneous Regression Test

Model Summary of Table 4 showed that the R Square value was 0.095 or 9.5%. This result indicated that the influence of learning motivation, pre-test of problem-solving ability, the 1st treatment of problem-solving ability in week 2, and the 2nd treatment of problem-solving ability (post-test) in week 3 on the cumulative achievement index was 9.5%. At the same time, the rest (90.5%) was influenced by other factors which were not examined in this study.

Table 5 shows that the Sig. value was  $0.009 < 0.05$ . It meant that  $H_0$  was rejected and  $H_a$  was accepted. In other words, there was an influence on the learning motivation through analyzing the initial problem-solving ability (pre-test), the 1st treatment of problem-solving ability, and the 2nd treatment of problem-solving ability (post-test) towards the students' Grade Point Average (GPA).

### Partial Regression Test

**Table 6.** Partial Regression Test

Model		Coefficients <sup>a</sup>					Correlations		
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Zero-order	Partial	Part
	B	Std. Error	Beta						
1	(Constant)	3,053	,292		10,473	,000			
	Motivasi Belajar	,007	,004	,154	1,866	,064	,157	,160	,154
	Kemampuan Pemecahan Masalah1	-,076	,032	-,205	-2,370	,019	-,142	-,201	-,195
	Kemampuan Pemecahan Masalah2	,088	,034	,236	2,597	,010	,177	,220	,214
	Kemampuan Pemecahan Masalah3	,003	,035	,008	,091	,928	,051	,008	,007

a. Dependent Variable: Indeks Prestasi Kumulatif

Based on the coefficients in Table 6, it was known that the Sig. on the learning motivation was  $0.064 > 0.05$ , and the Partial Correlations value was 0.160. It meant that  $H_1$  was rejected. In other words, there was no effect of learning motivation on the achievement of the Grade Point Average (GPA). However, the Sig. value in the initial problem-solving ability (pre-test) variable was  $0.019 < 0.05$ , and the Partial Correlation value was -0.201, which meant  $H_2$  was accepted. In other words, there was a negative effect on the ability to solve the initial problem (pre-test) on the GPA achievement of 4.04. %  $((-0.201) \times (-0.201) \times 100 = 4.04)$ . In addition, Sig. value on the problem-solving ability of the 1st treatment in week 2 was  $0.010 < 0.05$ . The value of Partial Correlations was 0.220, which meant  $H_3$  was accepted. In other words, there was a positive effect on the problem-solving ability of treatment in week 2 on the GPA achievement of 4.84%  $(0.220 \times 0.220 \times 100 = 4.84)$ . Furthermore, Sig value. on problem-solving ability in the 2nd treatment of week 3 (post-test) was  $0.928 > 0.05$ , and the value of Partial Correlations was 0.08, then  $H_4$  was rejected. In other words, there was no effect of the problem-solving ability of the treatment of post-test on students' GPA.

Students sometimes had not been able to find and solve a problem experienced due to several factors that affect the problem-solving process. According to Rakhmat &

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Surjaman (1999), motivation is one factor that influences problem-solving. In addition, Ellis (1998) stated that motivation greatly influences the problem-solving process. Moreover, Yuhani, Zhanty, & Hendriana (2018) said that the mathematical problem-solving ability of students whose learning uses a problem-based learning approach is better than students whose learning uses ordinary learning.

Motivation is more precise in solving problems by increasing motivation, which will result in accuracy in problem-solving. This research described that a person could increase motivation for problem-solving. This motivation affected the efficiency of problem-solving. This research is in line with the study conducted by Aspriyani (2017) & Ihsan (2016), which states that there is a significant influence between students' achievement motivation on mathematical problem-solving abilities and has a positive correlation between the two research variables.

Apart from motivation, learning activities are also accompanied to improve problem-solving skills. This is based on the results of research conducted by Agustin (2014), which shows that motivation and learning activities significantly affect the results of problem-solving tests.

## CONCLUSION

Based on the data analysis, this research indicated that the development of learning motivation was feasible and effective in improving the students' problem-solving abilities. It could be proved by the Tests of Within-Subjects Contrasts, which showed that the Sphericity Assumed value was Sig. 0.00, which was less than 0.05, then  $H_0$  was rejected, and  $H_a$  was accepted; in other words, there was clear evidence that the treatment results significantly influenced the development of problem-solving abilities during treatment. There was also an influence of learning motivation variables, pre-test of problem-solving ability, treatment in week 2, and treatment in week 3 (post-test) on the achievement of the students' GPA of 9.5%. At the same time, 90.5% was influenced by other factors which were not examined in this study. The results of this study are expected to make a significant contribution both theoretically and practically to lecturers and higher education institutions in motivating students to be able to face and solve their problems through the development of learning motivation.

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