



Effect of Problem Based Learning Model Combination Flipped Classroom Against Problem Solving Ability

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Abstract

The purpose of this study was to examine the effect of the problem-based learning model combined with the flipped classroom on students' problem-solving abilities in learning the Islamic Religious Education chapter of Zakat. The type of research used is quasi experiment. This research was conducted on Islamic Religious Education learning in Class VIII SMPN Gondang Nganjuk Indonesia. The research subjects were students of class VIII A (experimental class) and class VIII B (control class). Hypothesis test using SPSS application with one way ANOVA test. The results showed that (1) the results of the implementation score of the problem based learning model combination flipped classroom with an average score of 100 or good category; (2) the results of student learning activity scores taught using the problem based learning model with a combination of flipped classroom on students' zakat problem solving abilities, obtaining an

average score of 86.7 better than the average score taught with the problem based learning model without a flipped combination. classroom which is 85.5; and (3) the results of hypothesis testing with one-way ANOVA test showed a significance value of $0.008 < 0.05$. The problem-based learning model combined with the flipped classroom has a better effect on the problem-solving abilities of students' Islamic education learning compared to the problem-based learning model without the flipped classroom combination, as shown by the average score of the problem-solving ability test of Islamic Religious Education chapter on students' Zakat. The problem based learning combination of the flipped classroom is 79.36 and the problem based learning model without the combination of the flipped classroom is 74.96. The problem-based learning model combined with the flipped classroom can be an alternative learning model to improve problem-solving skills in the Islamic Education Learning chapter of students' Zakat

Keywords: problem based learning model combination flipped classroom, problem solving, Islamic education.

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INTRODUCTION

Problem based learning has an important role for students in thinking logically and creatively to solve problems and make decisions (Saídijah, 2013; Sari, 2017). Problem solving ability as a goal of learning based on Problem based learning (NCTM, 2000) and a means of developing students' mindsets in everyday life (Phonapichat, Wongwanich, & Sujiva, 2014; Sari, 2017; Croft, Kouvella, & Martinez, 2018; Zayyadi & Subaidi, 2018), so that students are able to solve the problems they face.

Problem solving ability is one of the important factors for students in the learning process (Docktor & Mestre, 2014; Ibrahim & Rebello, 2012) making it easier for students to solve the problems they face (Ozrecheroglu & Caganaga, 2018) as well as being wise in finding solutions and being the best in conditions. problematic (Cockun, Garipagaoglu, & Tosun, 2014). Polya (1973) states problem solving in learning as a student's ability to solve problems to get the right answer by understanding the problem, devising a plan, carrying out the plan, and looking back. Problem solving skills as one of the 21st century skills (Jang, 2015; Reeve, 2016) are needed and must be possessed by students (Ryan, Frodermann, Heller, Hsu, & Mason, 2016; Ibrahim & Rebello, 2012; Jang, 2015). Problem solving ability is also an important goal that must be achieved in education (Ding, Reay, Lee, & Bao, 2011; Seyhan, 2014) in order to continue to compete in the future (Belland, Walker, Olsen, & Leary, 2015).

Students' problem-solving abilities are still in the low category (Alias & Ibrahim, 2015; Argaw, Haile, Ayalew, & Kuma, 2017). Problem solving ability in student learning in Indonesia based on the results of an assessment by The Third International Mathematics and Science Study (TIMSS) in 2011, Indonesia is in 38th position out of 42 countries with a score of 386 (Mullis, Martin, Foy, & Arora, 2012), in 2015 at position 45 out of 50 countries (Mullis, Martin, Foy, & Hooper, 2015) and the Program for International Student Assessment (PISA) in 2012, Indonesia was ranked 64 out of 65 participating countries (OECD, 2013), in 2015 was in position 63 of 70 countries (OECD, 2016), then the Program for International Student Assessment (PISA) in 2018, achievement abilities, for example in Islamic Religious Education learning the Zakat chapter, Indonesian students were ranked 72 out of 77 countries, with a score of solving ability student problems of 379 below the average score, which is 489 (OECD, 2019). The results of this assessment show that the ability of Indonesian students in solving and solving problems in this field is still in the very low category.

The TIMMS & PISA assessment results are supported by research results by Dwijayanti & Kurniasih, (2014); Ulya (2016); Rostika & Junita (2017); Sahyar, Sani, & Malau (2017); Indrawati & Rusmayadi (2019); Husna, Veronica, & Kurniasih (2019)



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stated that most students have difficulty solving problems. Facts in the field, most of the VIII graders at SMPN Gondang Nganjuk Indonesia still have difficulty solving and solving math problems. This is because learning activities do not provide opportunities for students to develop problem solving skills (Doorman, Drijvers, Dekker, Heuvel-Panhuizen, de Lange, & Wijers, 2007; Wardhani & Rumiati, 2011; Cahyani & Setyawati, 2016; Rostika & Junita, 2017), students are more likely to memorize formulas than do concept analysis (Lasry, Finkelstein, & Mazur, 2009; Docktor & Mestre, 2014), and the learning process is still teacher-centered (Zahriani, 2014; Sihalo, Sahyar, & Ginting, 2017; Riska & Amir MZ, 2018), so that students are less active in building their own Islamic Religious Education knowledge. Teachers need to apply an effective learning model to foster students' Islamic Religious Education problem solving abilities (Mataka, Cobern, Grunert, Mutambuki, & Akom, 2014; Anggraini, Kartono, & Veronica, 2015; Prahani, Nur, Yuanita, & Limatahu, 2016). Alternative learning models that can be applied are problem based learning models combined with flipped classrooms.

The flipped classroom combination problem based learning model is a combined model with problem based learning activities carried out in reverse classrooms (Cakiroglu and Ozturk, 2017) by utilizing learning technology and supporting authentic learning (Johnson, 2013; Chis, Moldovan, Murphy, Pathak, & Muntean, 2018). The problem based learning model is a student centered learning model (Tan, 2003; Tarhan, Kayali, Urek, & Acar, 2008) and focuses on problem solving abilities (Izzaty, 2006; Tarhan, Kayali, Urek, & Acar, 2008; Eggen & Kauchak, 2012; Steck, DiBiase, Wang, & Boukhtiarov, 2012). Meanwhile, the flipped classroom model is a student centered learning model by reversing the traditional classroom learning system that has been carried out by teachers (Bergmann & Sams, 2012; Midun, Degeng, Kuswandi, & Ulfa, 2019). The combination of the problem-based learning and flipped classroom models allows students to spend time outside the classroom to study, and inside to solve problems (Chis, Moldovan, Murphy, Pathak, & Muntean, 2018) so that students' abilities can improve in problem solving (Srilaphat & Jantakoon, 2019).

The combination of problem based learning and flipped classroom models is due to obstacles in the application of problem based learning models in the learning process, including students who do not have an adequate understanding of the problems to be solved and problem based learning takes a longer time (Saleh, 2013; Sanjaya, 2014; Nurdin & Adriantoni, 2016; Tyas, 2017), resulting in less than optimal achievement of learning objectives, the flipped classroom model is a home learning system then discusses material in class by emphasizing the use of learning time in class (Goughan, 2014; Damayanti, Santyasa, & Sudiatrika, 2020). During the Covid-19 pandemic, which applies face-to-face learning with a limited time scale, this model can be an effective solution in the learning process. Therefore, the problem based learning and flipped classroom models are combined.



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Based on theoretical and empirical data, problem solving ability is one of the important and fundamental factors in learning. Problem solving skills develop high-order thinking and wisely decide on solutions to solve problems. The application of the flipped classroom combination problem based learning model can not only improve problem solving abilities, but the attitude of student learning responsibility and independence increases, so that learning outcomes are better than before.

RESEARCH METHODS

This study used a quasy experimental research type (quasy experimental research). The research design used was posttest only control group design. This design involved two groups, namely the control group and the experimental group. The population in this study were all students of class VIII at SMPN Gondang Nganjuk Indonesia. The research subjects were students of class VIII A (experimental class) totaling 25 students and class VIII B students (control class) totaling 26 students.

The variables in this study include (1) independent variables, consisting of (a) the problem based learning model with a flipped classroom combination applied to the experimental class marked "PBLFC" and (b) the problem based learning model without a flipped classroom combination applied to the control class marked with "PBL" and (2) the dependent variable is the student's problem solving ability.

The data collection technique used in this study was a problem-solving test technique. The research instrument used was a math problem solving test sheet. Data analysis used analysis prerequisite test and hypothesis test. Normality and homogeneity test to determine the normal distribution and homogeneity of the sample. In the test using a significance level of 0.05 with a significance value greater than α (Sig > 0.05). Hypothesis testing aims to determine the effect of the Problem Based Learning model combination of flipped classroom on problem solving abilities. Hypothesis testing using one way ANOVA test assisted by SPSS with a significance value smaller than α (Sig < 0.05).

RESULTS AND DISCUSSION

This study aims to examine the effect of the flipped classroom combination problem based learning model on students' problem solving abilities.

The results of the observation of the implementation of the problem based learning model combined with the flipped classroom and the Problem Based Learning model without a combination of flipped classrooms showed an average score of 100 or good categories, meaning that the learning stages of the two models used were in accordance with the learning steps. Student learning activities in the two treatment classes also showed good results. Student learning activities that were taught using the problem based learning model with a combination of flipped classrooms obtained an average score of 86.7 and student learning activities that were taught using the problem



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based learning model without a combination of flipped classrooms obtained an average score of 85.5, meaning that both student activity treatment class in good category.

After testing the reliability and validity of the problem solving test instrument in this study it shows (1) reliable because the test scores obtained are in the high category, and (2) valid because the significance value of each item in the statement of the students' problem solving test is less from α 0.05, it means that it has met the reliability and validity requirements, so that the test can be continued.

Table 1. Normality Test of Test Score Results
Problem Solving Ability

Tests of Normality				
	Class	Kolmogorov-Smirnov ^a		
		Statistic	df	Sig.
Problem Solving	PBLFC	.155	25	.122
Ability	PBL	.155	26	.108

a. Lilliefors Significance Correction

Based on table 1, the significance value in the two classes shows a significance value above the α significance level of 0.05. In the experimental class that was taught using the problem based learning model the combination of flipped classroom (PBLFC) was 0.122 and the control class taught using the problem based learning model without a combination of flipped classroom (PBL) was 0.108, so the sig value. more than α 0.05, it means that the score results are normally distributed.

Table 2. Homogeneity Test Problem Solving Ability
Test of Homogeneity of Variances

Problem Solving Ability			
Levene Statistic	df1	df2	Sig.
1.451	1	49	.234

Table 2 is the results of the homogeneity test, it is known that the significance value is 0.234. Because the value obtained from the homogeneity test at the significance level is ≥ 0.05 , it can be concluded that the data from the two classes have the same variance (homogeneous) value.

After the two tests above were carried out, it was followed by a hypothesis test with the one way ANOVA test, the results were as follows:

Table 3. Hypothesis Test Results Problem Solving Ability
ANOVA

Problem Solving Ability



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	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	246.573	1	246.573	7.529	.008
Within Groups	1604.722	49	32.749		
Total	1851.294	50			

The results of the Hypothesis test in Table 3 show the sig value. smaller than the significance level of 0.05 (sig <0.05), namely the sig value. is 0.008 less than 0.05 (0.008 <0.05), meaning that there is a difference in the effect between the two learning models used on students' problem solving abilities.

The difference in the effect of the two learning models used on students' math problem solving abilities, can be seen from the average score of students' math problem solving abilities from the two learning models, as shown in the following table:

Table 4. Data Score of Problem Solving Ability

Descriptives								
Problem Solving Ability								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean			
					Lower Bound	Upper Bound	Minimum	Maximum
PBLFC	25	79.36	6.304	1.261	76.76	81.96	72	94
PBL	26	74.96	5.103	1.001	72.90	77.02	68	84
Total	51	77.12	6.085	.852	75.41	78.83	68	94

For more details, the data on the score of math problem solving abilities can be seen in the following histogram:

Figure 1. Histogram of Problem Solving Ability Score Data

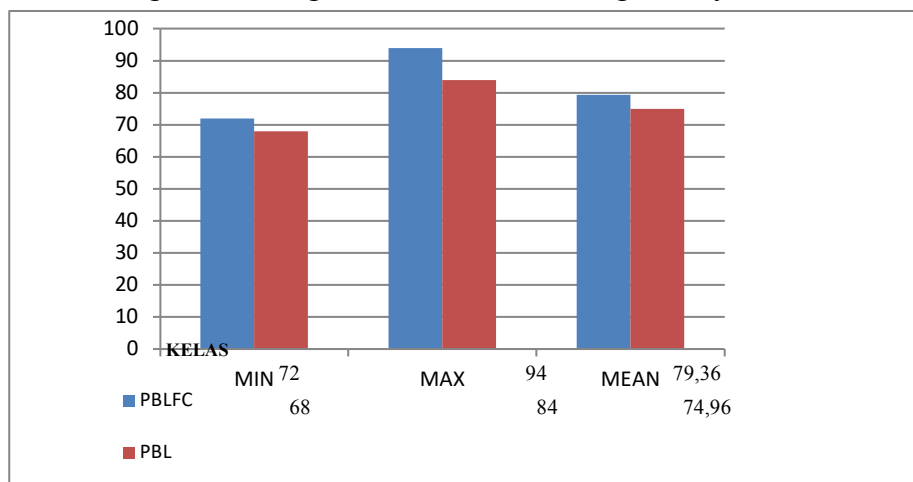


Table 4 and Figure 1 of the histogram above, show the average score of students' problem solving abilities who were taught the flipped classroom combination problem-based learning model (PBLFC) was 79.36 with a minimum score of 72 and a



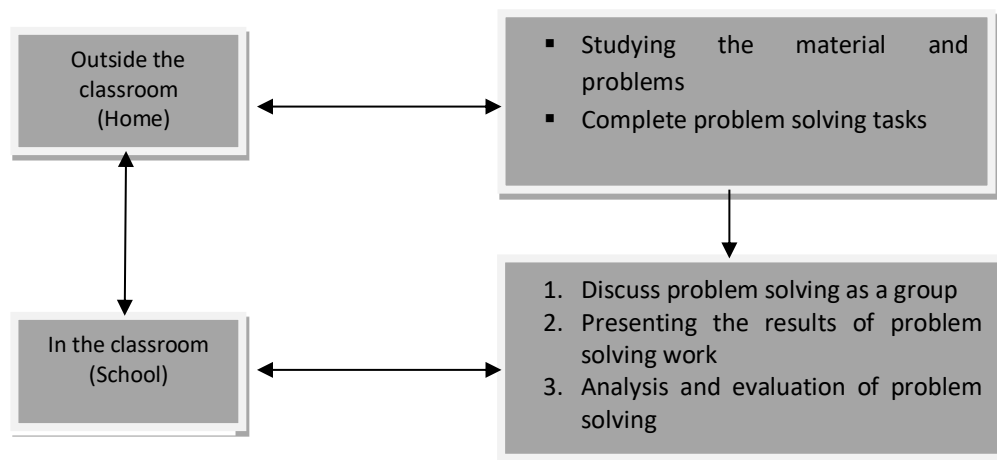
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maximum of 94. Meanwhile, the problem based learning model without the combination of flipped classroom (PBL) has an average value of 74.96 with a minimum score of 68 and a maximum of 84. The average score of students problem solving abilities from the two learning models used shows that there are differences in students' problem solving abilities in the class being taught problem based learning model combination of flipped classroom (PBLFC) and Problem Based Learning model without combination of flipped classroom (PBL). Classes in the Problem Based Learning model combination of flipped classrooms are better than classes in the problem based learning model without the combination of flipped classrooms in students' problem solving abilities.

The flipped classroom combination problem based learning model is an alternative learning model that can make learning effective (Andriyani & Suhendri, 2019), provides active learning conditions for students and involves students in problem solving activities encountered in learning activities using knowledge students have learned at home (Sinmas, Sundaygara, & Pranata, 2019). The flipped classroom combination problem based learning model includes active and effective learning models in solving student problems.

The application of the problem based learning model with a combination of flipped classrooms in learning is carried out outside the classroom and inside the classroom. Before learning in class (outside the classroom), the teacher provides problems and learning materials to work on and learn. The problem is done individually by looking for answers through various sources. The learning materials are in the form of instructional videos and textbooks. In the classroom, (1) groups of students discuss solving problems that have been given previously, (2) present the results of problem solving work, and (3) analyze and evaluate the problem solving process. The process of implementing the problem based learning model for a combination of flipped classrooms can be described as follows:

Figure 2. Implementation of the Problem Based Learning Model
Combination of Flipped Classroom





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The learning process of the problem based learning combination of flipped classrooms is different from the learning process of the problem based learning model without a combination of flipped classrooms. All student activities in the problem based learning model without a combination of flipped classrooms are carried out in the school class, starting from student orientation to problems, organizing students to learn, assisting students in independent and group investigations, developing and presenting work results, and analyzing and evaluating processes solution to problem. This difference has an effect on the effectiveness of the learning process in solving problems and learning time, meanwhile, learning the problem based learning model without a combination of flipped classrooms is hampered by a lack of learning time. This shows that the class that is taught using the problem based learning model combination of flipped classroom has a better ability than the class that is taught using the problem based learning model without a combination of flipped classroom.

The problem based learning model combination of flipped classroom is a student-centered learning model, giving students the freedom to learn with their own learning styles (Hwang & Chen, 2019). The results of research by Yurniwati & Utomo (2020) state that the problem based learning model combination of flipped classrooms can improve students' high-level Thinking Skills and provide opportunities for students to improve their independent learning and collaboration abilities. The results of research by Sinmas, Sundaygara, & Pranata (2019) also state that the problem based learning model combination of flipped classrooms can improve student achievement.

The advantages of learning the flipped classroom combination problem based learning model are that students can learn more flexibly according to their learning time and needs, given the ability to solve contextual problems, and are given technological literacy so that students are technology literate in the learning process (Viyana, 2020). The results of research by Chis, Moldovan, Murphy, Pathak, & Muntean (2018) state that the problem based learning model combination of flipped classrooms can create a pleasant learning atmosphere, encourage authentic learning, and allow students to spend time learning outside the classroom and inside. class to solve problems. Likewise, the results of research by Srilaphat & Jantakoon (2019); Arnata, Mardana, & Suwindra (2020) state that the problem based flipped classroom model is effective for improving students' problem solving skills.

With the effect of the flipped classroom combination problem based learning model on students' problem solving abilities, this learning model is the best solution for solving learning problems. Problem-solving abilities will also have an impact on learning outcomes, both cognitive, affective, and psychomotor students.



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CONCLUSION

Based on the results of research and discussion, it can be concluded that there is an effect of the flipped classroom combination problem based learning model on students' problem solving abilities. This is evidenced by (1) the results of the problem based learning strategy implementation score with an average score of 100 or good category; (2) the results of the scores of students learning activities taught with a flipped classroom combination of problem based learning models on students' Islamic Religious Education problem-solving abilities, obtained an average score of 86.7 better than the average score taught by the problem based learning model without combination flipped classroom namely 85.5; and (3) the results of hypothesis testing using the one way ANOVA test show a significance value of $0.008 < 0.05$. The flipped Classroom combination problem based learning model has a better effect on students problem solving abilities compared to the problem based learning model without the flipped classroom combination, indicated by the average test score of students' problem solving abilities, in the flipped classroom combination problem based learning model. is 79.36 and the problem based learning model without the flipped classroom combination is 74.96. The flipped classroom combination problem based learning model can be an alternative learning model to improve students' problem solving abilities.



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