The Influence of Three Stage Fishbowl Decision Strategy on Students' Mathematical Problem Solving Ability

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Abstract

This research has a purpose to know whether the influence of three stage fishbowl decision on students' mathematical problem solving ability in learning process. This type of research is a pseudo experiment by determining one class which take randomly as a sample as an experiment class. The problem in this research is the students' mathematic problem solving ability. The population is all the 8th students at junior high School 3 Lintongnihuta which consist of 6 classes with the total number of 180 students. The sample of the research is VIII-1 class with the total number of 30 students. The technique of data collection is conducted through an observation to observe student activities and a test to measure skills, intelligence knowledge, abilities or talents possessed by individuals or groups. Determining the result of mathematical problem solving ability of students, it uses statistical test. The result of research indicates that learning strategy of three stage of fishbowl decision have influence to student's mathematical problem solving ability equal to 35,77 % while the rest 64,23 % influenced by other factor.

Keywords: Three Stage Fishbowl Decision; Problem Solving Ability.

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1. Introduction

Education is an effort to develop individual ability to live optimally as an individual or a member of society. The effort has a purpose to improve the quality of education processes and outcomes which are constantly looked for, researched, and pursued through the study of various education components. The writer at [1] stated that mathematics is a field of study that is considered to the most difficult subject by the students, both non-learning disabilities and moreover for students with learning disabilities. In fact studies have found a negative relationship between math anxiety and math achievement across all grade levels as the author in [4].

This case is due to the student's low mastery in every level of mathematics education. The author at [12] suggested that problem solving is a process of applying knowledge previously obtained in new and different situations. Problem solving is very important in mathematics, so almost all Basic Competency Standards and Competencies emphasize the need to solve common problems. In an effort to improve the problem solving skills of mathematics teachers should try to train and familiarize students to do learning activities such as giving practice questions and solving existing mathematical problems. Teaching problem solving will provide many benefits and have a very important impact. For students to learn problem-solving skills, teachers need to be equipped with the pedagogical strategies necessary to effectively teach this skill as the author at [10].

Teaching students to solve problems enables the student to be more analytic in making decisions in life. In other words, when a student is trained to solve a problem, the student will be able to make a decision because the student becomes skilled about how to gather relevant information, analyze information, and realize how it is necessary to re-examine the results it has obtained like the writer in [8]. In mathematics learning, problem solving is an important component of mathematical education because of its practical role for individuals and communities such as authorship in [5]. According to the author [9] says in traditional matehmatics education the teacher proposes a problem to be solved; show a method which should be used; and gives exercises to practice solving this type of problem. Thus the student learns and uses an algorithm for a certain type of problem. This method of teaching mathematics doesn't promote the devolopment of mathematical thinking, problem solving skills, and-regulation learning. Based on the results of the OECD PISA study by the World Bank's support of 7355 15-year-olds from 290 SMP / SMA / SMK students in Indonesia in 2003 it was found that 96% of students were only able to master limited mathematics to solve simple problems, they could not solve complex issues And complex issues like the author in [6]. A teacher must be skilled to apply learning strategies in the learning materials to be delivered. Even in applying this type of learning strategy can see the characteristics of students. Strategy is a term that comes from the greek strategia, meaning "gen-eralship" as the author in [13]. A learning strategy is a common pattern of sequences of activities that must be undertaken to achieve a specific goal such as a writer at [15]. Three Stage Fishbowl Decision is one of the strategies included in Active Learning which is basically the purpose and core of learning is Active Learning, while the one that differentiates with other strategies is the implementation step of the strategy itself. According to the author in her journal [11] active learning is students' participation in learning and teaching process, where students themselves engage with and create their own learning experience. The author [14] stated that active learning process will give a great impact to real life.

This learning involves students in the learning process. Students are asked to learn and think about what they are doing. In addition, students not only receive information from teachers, but also have to find their own information. By way of learning this usually students will feel a more pleasant atmosphere so that learning outcomes can be better as the author in [20]. According to the author in [17] said three-stage fishbowl decision is a strategy which has a three stage in discussion which a portion of the group forms a discussion circle and the remaining participant form a listening circle around the group discussion. Discussion through fishbowl is a discussion to make a decision that the chairs are managed a half of circle (like a bowl or arched a half of circle) with 2 or 3 chairs are empty that look towards the participants discussion. The remaining participants form a listening circle around the discussion group, as if they look a fish in the bowl (fishbowl). As the discussion group conveys the outcome of the discussion, the remaining participants form a listening circle that wishes to comment or question can sit on empty seats and leave the chair after speaking like the author on [16].

2. Research Methods

This type of research is a pseudo –experiment by determining a simple class taken randomly as an experimental class. In this research, the data were collected on one experimental class with treatment. Population is all the 8th students at junior high School 3 Lintongnihuta academic year 2014/2015 which consist of 6 classes with the total number of 180 students. The sample of the research is 8-1 class with the total number of 30 students. The research design used is one-shot case study. The treatment given to the experimental class is the use of the Three Stage Fishbowl Decision learning strategy. Researchers only held a one-time treatment that is estimated to have an influence. Then held post-test and draw conclusions.

Table 1: Study Design

Group	Pre-Test	Treatment	Post-Test
Eksperiment	-	X	O

Note :

X   = Treatment.

O   = Post-Test results after treatment.

The data collection tools used are observation and test. Where observations involve observers and students. Observers fill out the observers sheet of student activities that have been provided. The data obtained in this study were collected using observation sheet.

While the test contains a series of questions or exercises and other tools used to measure the skills, knowledge of intelligence, abilities or talents possessed by individuals or groups. Test questions consist of many test items each measuring one variable type. The test used is essay test. Because the essay test can measure student's mathematical problem solving abilities of the material being studied.

Table 2: Guidelines Scoring of Problem Solving

Rated aspect	Reaction to the Problem	Score
Understanding the problem	Do not understand the problem or no answer	0
	Ignoring the terms of the interpretation of the problem is less precise	1
	Understand the problem well	2
Plan the solution	No settlement strategy plan	0
	The strategy being run is less relevant	1
	Using one specific strategy but leading to the wrong answer	2
	Use some correct strategies and lead to the right answers	3
Solve the problem as planned	No settlement at all	0
	There is a settlement but the procedure is not clear	1
	Using one particular procedure that leads to the wrong answer	2
	Using one correct procedure	3

3. Research Result

The result of class observation in the sample using Three Stage Fishbowl Decision learning strategy toward students' mathematical problem solving ability got the lowest score of 55 and the highest score 90. The mean value of 70 with the standard deviation of 11,522.

Table 3: Observation Result Data

Number	Xi	Fi	Average
1	55	5	
2	60	5	
3	65	4	
4	70	5	70
5	75	1	
6	80	4	
7	85	4	
8	90	2	
Total	**2100**	**30**	

Note:

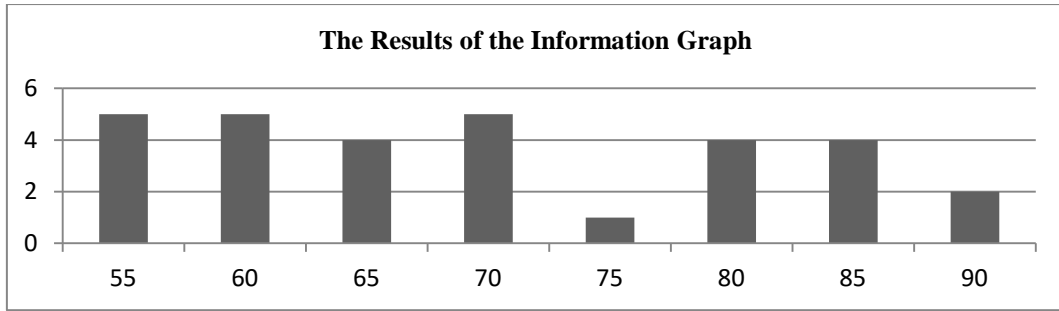Xi   : Observation Value, Fi   : Frequency of Value

Figure 1: Value of Observation Results

Post-Test results in the sample class obtained the lowest value of 40 and the highest value 94, the average value of 71,1 and standard deviation 15,107. Post-Test value data of the sample class can be seen in the following table:

Table 4: Post-Test Result Data

Number	Yi	Fi	Average
1	40	1	
2	45	1	
3	50	2	
4	55	2	
5	60	1	
6	63	5	**71,1**
7	69	4	
8	75	3	
9	82	2	
10	88	8	
11	94	1	
Total	**2133**	**30**	

Note:

Yi: Post-Test Value, Fi: Frequency of Values

Based on regression analysis result obtained regression equation that is $\hat{Y} = 16,191 + 0,784X$. In the equation obtained regression b = 0,784 positive, which means that both variables have a positive linear relationship and the results of students' mathematical problem solving ability will increase with the influence of Three Stage Fishbowl Decision learning strategy if the learning strategy of Three Stage Fishbowl Decision increases by one unit. From the regression linear test obtained $F_{count} < F_{table}$ or $1,430 < 2,55$ then H_0 rejected and H_a accepted, so

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the linear regression model. From regression significance test obtained $F_{count} \geq F_{table}$ or $15,595 \geq 4,20$ then H_0 accepted and H_a rejected, so the regression model means. So it can be concluded that the linear regression model and means, so it means that there is the influence of learning strategies Three Stage Fishbowl Decision on students' mathematical problem solving skills.
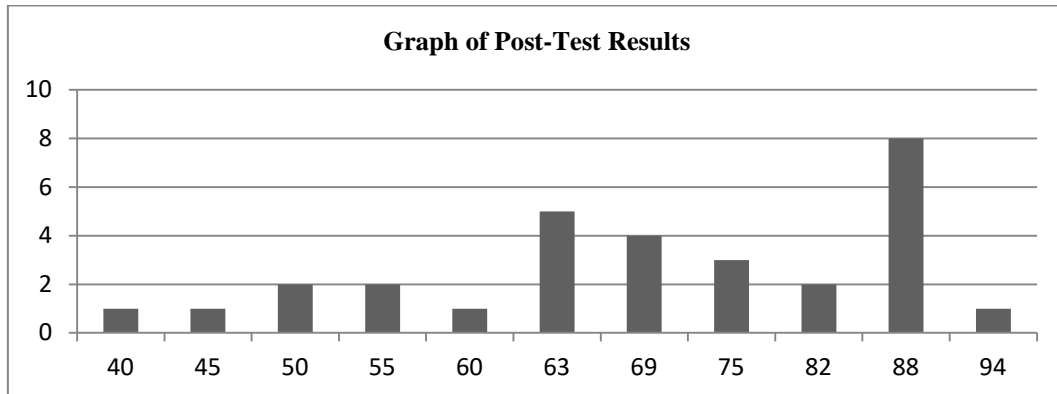

Figure 2: Post-Test Result Value

Table 4: ANAVA Calculation Results

Source Variance	Dk	The Sum of Squares	Average Squares	F_{count}
Total	30	JKT=158275	RKT	-
Regresi (α)	1	$JK_{reg(a)}=151656,3$	$JK_{reg(a)}=151656,3$	
Regresi (b|a)	1	JK(b|a)=2367,68	$S^2_{reg}=2367,68$	$F_1 = 15,595$
Residu	28	$JK_{res}=4251,02$	$S^2_{res}=151,822$	
Suitable Tuna Mistakes	6	JK(TC)= 1192,72	$S^2_{TC}= 198,787$	$F_2 = 1,430$
	22	JK(E) = 3058,3	$S^2_E=139,014$	

Based on the calculation result obtained correlation coefficient r = 0,598, mean relation of learning strategy of Three Stage Fishbowl Decision to ability of problem solving of students' mathematics moderate or enough. Based on the calculation of significance test correlation coefficient obtained $t_{count} = 3,951$ and $t_{table} = 2,05$. Thus $t_{count} > t_{table}$ or $3,951 > 2,05$ then hypothesis H_0 rejected and H_a accepted then concluded there is a meaningful relationship on the learning strategy of Three Stage Fishbowl Decision on students' mathematical problem solving abilities. Then from the calculation coefficient of determination obtained $r^2 = 35,77\%$ means learning strategies Three Stage Fishbowl Decision has an influence on students' mathematical problem solving abilities of 35,77% while the remaining 64,23% influenced by other factors.

4. Discussion

Based on the results of the above research it can be said that the learning strategy of Three Stage Fishbowl Decision has an influence on students' mathematical problem solving abilities. This research is in line with the authors of [19] who explain that the development of a person's ability can be seen from his ability to complete tasks or solve problems independently. Vygotsky posits three categories of side achievement in his attempt to solve problems, namely (1) students achieve success well, (2) the student achieves success with help, (3) the student fails to succeed. In this case it appears that students achieve success well on mathematical problem solving with the help of Three Stage Fishbowl Decision learning strategy. The author on [3] said that there is an increase in students' achievement on the subject of Oxidation Reduction Reaction in the first Grade SMAN 1 Peranap through the implementation of active learning strategy of type Three-Stage Fishbowl Decision. The author on [2] also said that the Three Stage Fishbowl Decision learning strategy is well used to interpret historical facts at SMAN 1 Bukit Tinggi. In addition the authors in [7] say that the active learning model of Three Stage Fishbowl Decision is applied more effectively to improve student learning activities, and can be applied better and more effectively to improve the conceptual understanding of students who learn lectures. The other research that can strengthen this research from the writer in [18] which said that there is influence from Three Stage Fishbowl Decision learning strategy to mathematics learning achievement of students SMP Al Islam I Surakarta.

5. Conclusion

Based on the results already obtained, the following conclusions can be made:

1. The average value of the observation result in the experimental class is 70 and the mean score of the post-test result is 71,1 can be interpreted that the learning implementation with the learning strategy of Three Stage Fishbowl Decision and the students' mathematical problem solving ability are included in either category.

2. Regression equation obtained $\hat{Y} = 16,191 + 0,784X$ which means that both variables have positive linear relationship and result of problem solving ability of student mathematics will increase with influence of learning strategy of Three Stage Fishbowl Decision of one unit. The result of regression linear test obtained $F_{count} = 1,430$ and regression significance test obtained $F_{count} = 15,595$ so that regression model is said to be linear and mean.

3. Result of calculation of correlation coefficient is obtained equal to 0,598 and result of significance test of correlation coefficient got $t_{count} = 3,951$ mean relation of learning strategy of Three Stage Fishbowl Decision to problem solving of student math moderate or enough and mean. And from result of calculation of coefficient of determination obtained $r^2 = 35,77\%$ mean learning strategy of Three Stage Fishbowl Decision have influence to student math problem solving ability equal to 35,77%.

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