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Effect Size Of Pakem Model Implementation In Mathematic Learning On Improving Student's Problem-Solving Mastery On Function Material At Junior High School

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Abstract

This research is motivated by the level of junior high school students' mathematical problem solving was still low. Based on the preliminary study which conducted by one of the schools in Batam shows the average score for mathematics was 62 for 100 scale. The purpose of this study is to obtain and investigate the improvement of students' problem-solving mastery on relations and functions material as the effect of PAKEM model. The research method which used is pre-experiment and with one group pretest-posttest design. The subjects of this study were VIII grade students of one of the first junior school in Batam at odd semester 2015-2016 academic year, totally 32 students. Sample of this research were taken by random sampling technique. Students' problem solving mastery was measured by using problem-solving test, whereas the students' problem-solving mastery improvement between before and after the concept of effect size implementation was calculated to find the effect size of applying the PAKEM model. The result showed that the effect size of applying the PAKEM model on improving problem solving mastery is 3.3, it means, the PAKEM model implementation on improving problem-solving mastery on function has a strong influence. It can be concluded that the PAKEM model implementation can improve problem solving mastery.

Keywords: *effect size, the PAKEM model. problem-solving mastery*

I. INTRODUCTION

One of the goals of maths learning at school is to develop students' maths problem solving mastery. According to Devlin (Kurniawan, 2010), he explains that maths problem solving mastery is an important element in every learning process at any education levels and as one of the strength as the aim of maths learning at every junior high school level which gives a big change to the students to solve every problem related to the daily life,job, and other science matters.

The effort to develop maths problem solving mastery needs educators and researchers' attention seriously, because facts in the field, explains that maths problem solving mastery needs a serious attention and indicated as students' weakness point. The result of international survey report related to students' maths problem solving mastery in Indonesia,namely; Trends International Mathematics and Study (TIMSS) and the Programme for International Student Assessment (PISA) (Wardhani and Rumiati , 2011) points that Indonesian junior high school students' maths problem solving mastery in unroutine matters (mathematical problems) are still weak.

Learning process Improvements, especially in using appropriate models in learning process is one of solutions which researchers consider can improve students' maths problem solving mastery. One of suitable models to solve this problem is PAKEM. Model. PAKEM. Model will help students to maximize problem solving mastery, and be able to be to compete, active, effective, creative and intelligent in improving problem-solving mastery whithin himself. According to Daryanto (2013: 117), PAKEM Model is a learning model that allows students perform variuous activies (learning process)to develop the skills, attitudes, and understanding about various learning sources and devices including environment utilization so that learning more interesting, joyful, and effective. Besides it, PAKEM Model will invite students be able to maximize problem-solving mastery and to compete, role actively, effectively, creatively and intelligently on improving problem-solving mastery whithin himself.

The purpose of this study is to know the effect size of the implementation of PAKEM model in improving students' maths problem solving mastery in the functions material.

II. THEORIES

Rusman (2010 : 322) , PAKEM model is a learning model and becomes as a guideline in reaching assigned goals.PAKEM model characteristics:

1. Active
   It means, this learning model allows learners to interact actively with the environment , manipulate objects in it and observe the effect of those object manipulations.
2. Creative
   It means , learning to build learners' creativities in interacting with their environment, materials and other learners, particularly in facing the challenges or tasks that must be resolved in learning.
3. Effective
   It means, with active learning, creative and joyful can increase the learning effectiveness, which in turn can improve the quality of students' outcomes.
4. joyful
   It means, PAKEM model is designed to create a joyful learning atmosphere

The steps of PAKEM model learning according to Susanto (2013) which researcher applied in this study are as follows:

1. Review : teacher and students review previous material.
2. Development: the teacher constantly presents a new idea and expanding concept .
3. Controlled Exercise: teacher examines the misconceptions possibilities. It is recommended in group working.
4. Seat work: independent student or group in resolving issues / problem solving.
5. Individual/groups Reports: individual/group reports are reported for improvement needed.
6. Work display: the work is displayed which function as work appreciation at the classroom library / reading corner .
7. Giving homework for follow-up : homework should be corrected and valued .

III. RESEARCH METHOD

This study was a quasi-experimental study, design of the study was a one-group pretest - posttest. The population of this study was VIIIth grade student of one of junior high school in Batam, odd semester,2015-2016 academic year, while the sample was grade VIII3 students, they were 32 students. Sample technique was random sampling technique. The instrument used was the maths problem solving mastery test.

IV. RESULT AND DISCUSSION

In this stud, to determine the effect of the application of PAKEM model in learning used size effect equation which formulated by Cohen (1992)

$$\boldsymbol{d = \frac{\mu_{post} - \mu_{pre}}{\sigma_{pooled}}} \quad (\mathbf{1})$$

$$\boldsymbol{\sigma_{pooled} = \sqrt{\frac{\left(\sigma_{pre}^2 + \sigma_{post}^2\right)}{2}}} \quad (\mathbf{2})$$

This equation was formulated to look at the effect size after treatment given, so that it needed to know the average value of class before (μ_pre) treatment given and the average value of the class after given treatment (μ_post) given. To determine the value of d, standard deviation was also needed before

the treatment(σ_pre) given and standard deviation after treatment(σ_post) given. Categorizing the effect size toward concept understanding improvement by using the effect size formulation as follows .

Table 2. Effect size value criteria(d)

Value d	Interpretation
$0 \leq d \leq 0.20$	weak
$0.20 < d < 0.80$	medium
$d \geq 0.80$	Strong

source: (Rahmaniar & dkk: 2015)

After research conducted, to determine the effect size of the PAKEM model implemetation toward Mathematic Problem-Solving improvement, it was found result of the research which calculated using effect size formula as follows:

Table 3. Effect Size Of PAKEM Model Implementation On Improving Mathematic Problem-Solving Mastery recapitulation

N	μ_{pre}	μ_{post}	σ_{pre}	σ_{post}	Effect Size (d)
32	3.8	8.7	1.8	1	3.3

Source: (Rahmaniar dkk: 2015)

Based on the table, the researcher obtained the value of the effect size, 3.3, itindicates that the PAKEM model has a strong influence on improving students' mathematical problem solving mastery. The result was relevant to what Surantinah defines(in Ananda 2009: 6) that PAKEM Model is able to maximize problem solving mastery, and be able to compete, role actively, effectively , creatively and intelligently on improving problem-solving mastery within himsefl.

Figure 1 below, describes the effect size of the PAKEM Model implementation on improving mathematic problem solving mastery for each measured problem-solving mastery indicators, where the obtained effect size showed a strong influence too.

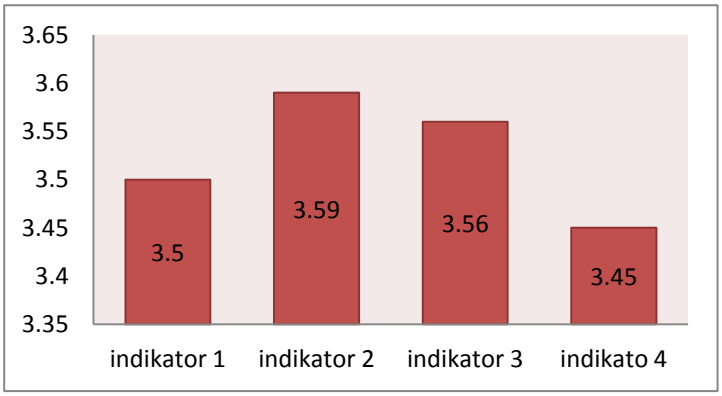

FIGURE 1. THE EFFECT SIZE FOR EACH INDICATORS

Information:
Indicator 1 : Understanding the problem
Indicator 2 : Choosing the suitable strategy to solve the problem
Indicator 3 : Resolving the problem correctly and systematically
Indicator 4 : Checking the accuracy of chosen strategy and the truth of problem solving gotten.

V. CONCLUSION :

PAKEM model has a strong influence on improving students' mathematic problem solving mastery in functions material. This is shown by the effect size achievement of 3.3 .

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