

The Treffinger Learning Model with RME Principles on Mathematics Learning Outcome by Considering Numerical Ability

S Ndiung

Primary Education

STKIP Santu Paulus Ruteng

Flores, NTT, Indonesia

punyaku79@gmail.com

Abstract— Teacher’s cleverness strongly determines the maximum achievement of learning outcomes in applying suitable learning models and approaches that relevant to the concept is being learned. This study aims to assess the effect of the Treffinger learning model using the principles of RME on mathematics learning outcomes by controlling the abilities of numerical students. The subject of study is fifth-grade students of elementary schools in Manggarai regency using the post-test only control group design of the experiment. This study involved 101 fifth grade students as a sample using a random sampling technique. The instruments were items test of mathematics learning outcome and numerical ability test. Data were analyzed by using ANCOVA aided by SPSS 23.0 program. The results showed that: 1) student mathematics learning outcomes using the Treffinger learning model with the principle of RME was higher than using conventional models. 2) student mathematics learning outcomes using the Treffinger learning model with higher principle RME compared to using conventional learning models. 3) numerical ability provides a 20.5% contribution to student mathematics learning outcomes. These findings show that the Treffinger learning model with RME principles has a significant effect on the students’ learning outcomes. Mathematics teachers should use this model for developing student mathematics learning outcomes.

Keywords: *Treffinger learning model, RME principle, mathematics learning outcome, numerical ability*

I. INTRODUCTION

The learning process must have an orientation towards mastering student competencies, which has an impact on maximum learning achievement. Students must have cognitive competencies, affective competencies, and psychomotor competencies during and after learning activities. Cognitive competence contributes 40% toward someone’s success, meanwhile affective and psychomotor competencies give 60% [1]. In the mathematics learning process, teachers must possess Math Content Knowledge (MCK) that affects the development of students’ learning outcomes. The research finding conducted by Sowder [2], who stated that in order to increase math knowledge and achievement, all math classrooms require teachers with in-depth knowledge of math. Sowder’s finding indicates that teachers’ mastery with in-depth content knowledge of math contributes to activate meaningful learning.

The learning process, which emphasizes the logic and computation ability, seems lacking exercising to the problem solving that challenge the thinking process, so learning outcome cannot be achieved optimally. Several factors, either internal or external, also affect students’ low learning outcomes. Acharya [3], found out the elements that students feel difficult to learn mathematics, such as (1) mathematics anxiety, less of attentive, having a bad conception toward mathematics, (2) insufficient students’ prior knowledge to learn mathematics problem creatively, (3) less of students’ involvement in learning mathematics, (4) too little consciousness and parent’s endorsement, (5) students have low economic background, they must accomplish home works to fulfill their daily needs. Hence, students are not interested to learn mathematics, and (6) lacking motivation and counseling guidance imprecisely to learn mathematics. Economy factor stated is in line with research findings undertaken by Salihu and Räsänen [4], who claimed that students who have an excellent economic background contribute significantly toward mathematics performance. Students who have low economy background shows low mathematics ability.

Realizing the importance of early learning about mathematics so that students can solve problems and be useful in the future, it is necessary to implement appropriate strategies in the learning process. Treffinger learning model is one of the learning models which is able to challenge the common sense and develop mathematics learning outcome that consists of three stages, i.e., basic tools, practice with the process, and working with real problem stage that contains creative learning techniques [5]. Afterward, the crucial steps in the Treffinger learning model are 1) accommodate a variety of new notions and understand lots of ways how to solve the problems; 2) use a creative idea which involves thinking process and feeling; 3) use feeling and creative thinking to solve the problems [6].

Research findings have supported the usage of the Treffinger learning model in the learning process. For example, Darminto [6] claimed that the implementation of the Treffinger learning model affects the development of mathematics problem-solving ability significantly. Maygayanti, Agustuni, and Sunarya [7] also claimed that there is a significant difference toward students’ learning outcome who taught by using the Treffinger learning model and Problem Based

Learning (PBL) model and average scores of the Treffinger's group is better than PBL and conventional groups.

Although a variety of research findings of the Treffinger learning model could increase students' mathematics learning outcomes, those did not explore at primary education. Therefore, Realistic Mathematics Education (RME) that have been examined so many times indicates the development of learning activity, learning outcome, motivation, and interest in learning mathematics for students in the primary education but not yet focus on creative learning as offered by the Treffinger model. The usage of RME in mathematics learning has been investigated in any kind of education researches. Arsaythamby and Zubainur [8] found out that RME is able to develop students' mathematics learning activity where through contextual learning and teacher guidance, students are able to construct their very well knowledge. Saleh, Prahmana, and Isa [9] claimed that RME learning is better than conventional in the development of students' learning outcomes and logical thinking in mathematics learning. Other research findings also claimed that RME learning is higher than conventional learning in the development of mathematics learning outcomes, students' activity, and motivation. [10],[11].

This research is oriented on the optimum achievement of mathematics learning outcomes through the accomplishment of the unfamiliar problem (non-routine questions) by integrating three stages of the Treffinger learning model with six RME principles. The concept of the integration between the Treffinger learning model with RME principles has not been conducted by previous researchers. Due to the characteristic of mathematics is an abstract, mathematics learning at the elementary school must be done by using a realistic approach, but, it is conducted with creative strategy. Hence, the integration between the Treffinger learning model with RME principles is essential to be considered. In this paper, the concept of this integration is highly supported.

A. Research Focus

The aims of this study were: 1) to analyze the difference in mathematics learning outcome between the students who learned mathematics through Treffinger learning model with RME principles and those who learned mathematics through the conventional learning model; 2) to analyze the difference in mathematics learning outcome between the students who learned mathematics through the Treffinger learning model with RME principles and those who learned mathematics through the conventional learning model, and 3) to find out the contribution of numeric ability to the students' mathematics learning outcome.

II. CONTEXT AND REVIEW OF LITERATURE

A. Mathematics Learning Outcomes

The learning outcome is determined by the frequencies of the students' response toward the concept that has been learned, so teachers are obligated to create an enjoyable learning atmosphere for getting a better response, which affects on the development of their learning outcome. Arends said that learning outcome assessment is a process to collect the

information about students and classroom which aim to make a variety of decisions precisely in the instructional [12]. Arends' idea is in line with Popham [13], who defined assessment in the education context as a formal effort to decide students' progress on the education itself. Learning outcome assessment refers to the cognitive, affective, and psychomotor domains. Anderson and Krathwohl categorized two types of cognitive domains, i.e., cognitive process dimension and knowledge dimension. The cognitive process dimension contains six categories of Bloom's taxonomy, namely, remember, understand, apply, analyze, evaluate, and create. Meanwhile, the knowledge dimension includes four categories, namely factual knowledge, conceptual knowledge, procedural knowledge, and meta-cognitive knowledge [14].

Mathematics becomes a vital component to develop the skills needed by someone to solve all kinds of problems in everyday life [15]. Research result found out that there is an interaction between basic arithmetic concept development and relational thinking. Students' concept development is associated with the arithmetic operation, such as summation, reduction, multiplication, and division. Besides that, students can use this concept effectively, in spite of they fail to prepare a formal statement as a relation among them. Indeed, relational thinking skills can be developed early. The primary school teachers and mathematics teachers have a big responsibility in the learning process, not only the nature of the counting operation but also the relation between enumeration and its operation through enumeration arrangement and class discussion.

Mathematics learning outcome which is meant in this research is learning outcome that obtained by students by using non-routine questions, i.e., using problem-solving questions in measuring high-level thinking with refers to Bloom's taxonomy of revision edition.

B. Numerical Ability

Mathematics is one of the subjects that aid in developing logical-mathematic ability [16]. However, students' logical thinking development cannot be taught for those who begin to learn by accomplishing the exercises questions on the book up to the end. Mathematics skill and its concepts require the students' real experiences, then integrated those with other knowledge. Learning activity should refer to the logical thinking process. Gardner [17] said that logical-mathematic intelligence is indicated by the reasonable patterns sensibility, internalize those patterns, numeric, and be able to manage long-way thinking. Numerical ability as an ability that associated with the numeral, i.e., a computation which is relevant to the accomplishment of basic operation count problems, such as summation, reduction, multiplication, and division. Intelligence development until sufficient competence stage as the main key of multiple intelligences. Becomes a solution for students who have low of logical-mathematic intelligence in developing his/her mathematics ability. This is strengthened by research findings conducted by Zulfairanatama and Hadi [18], who claimed that there are positive and significant effects between logical-mathematic intelligence and students' mathematics ability. Muntiari, Candiasa, and Dantes [19] also found out that there is an interaction effect between

the RME learning model and numerical ability toward mathematics learning achievement. The students who taught by using RME have a higher numerical ability and have better mathematics achievement than those taught in the conventional learning model. Numerical ability, which is meant in this research, is an ability that refers to the numeral, i.e., computation, which is related to the accomplishment of basic operation count problems, such as summation, reduction, multiplication, and division.

C. *Treffinger Learning Model*

The Treffinger learning model is a learning model that focuses on handling toward direct creativity problem that involves cognitive and affective skills [5]. By involving cognitive and affective skills at each stage of this Treffinger learning model indicates the inter-related of these skills in encouraging creative learning, which aims to the high-level thinking process. This is in line with the research findings conducted by Annuuru, Johan, and Ali [20]. They found out that the application of the Treffinger learning model is effectively used to develop students' high-level thinking. The important steps in the Treffinger creative learning model are 1) accommodating a variety of new ideas and seeing as many ways as possible to solve problems; 2) using ideas that involve thinking process and feeling; 3) using the creative feeling and thinking to solve problems [6]. The use of the Treffinger model in learning has been supported by two study findings [21] who concluded that the use of the Treffinger learning model gives a positive contribution to the development or improvement in the students' creative thinking and mathematical problem-solving. In addition, the Treffinger creative learning model can be implemented in education, starting from elementary to university.

D. *Realistic Mathematics Education Principles*

Realistic Mathematics Education (RME) is a mathematic learning approach that has been developed by Freudenthal in Holland. According to Gravemeijer in [22], realistic mathematics education is rooted in Freudenthal's interpretation of mathematics as an activity. Gravemeijer's idea indicates that RME has been developed based upon Freudenthal's notion, which highlights that mathematic as activities. The activities cover problem-solving, find the problem, and organize core issues, which claimed by Freudenthal, those as mathematization. RME is mathematics learning by using a realistic approach, which stimulates students more interest in learning mathematics due to nearby the students' real life. In the context of this research, the steps used in mathematics learning employed RME principles, which have been developed by Marja van den Heuvel-Panhuizen. Heuvel-Panhuizen reformulate six principles of RME: activity, reality, hierarchy, interconnection, interaction, and guidance principles [23]. The activity principle focuses on students are treated as active participants in the learning process; the activities are dominantly done by students, and the reality principle proposes the learning activity gets closer to students' "real-life" problems. Moreover, the level principle underlines that learning mathematics means students should pass various levels of understanding: from informal context-related solutions, through creating various levels of shortcuts and

schematizations, to acquiring insight into how concepts and strategies are related. Next, in the intertwinement principle concerns the mathematical content domains. Students are offered lots of problems in which they can use their various mathematical tools and knowledge. Furthermore, the interactivity principle means that learning mathematics is not only an individual activity but also a social activity, then the guidance principle refers to Freudenthal's idea of "guided re-invention" of mathematics.

E. *Treffinger Creative Learning Model with RME Principles*

The Treffinger learning model with RME principles in this study is an instruction that is deliberately designed by combining the stages in the Treffinger learning model and RME principles. The three stages in the Treffinger learning model and the six principles of the RME will collaborate with that result in the following integration: the basic tools stage uses reality principle and activity that will guide the students to the developing of mathematics learning outcome on the ability to accomplish non-routine problem, i.e., accomplishing unusual problem which is not accomplished by using routine procedure. The practice and process stage uses the principle of interaction and principle of reality that directs the students to the development of mathematics learning outcomes on the accomplishment of non-routine problems, which measures high-level thinking by linking the concept being learned with reality. While working with problem stage uses the principle of guidance, the principle of hierarchy, the principle of interconnection that is assumed to be oriented to the development of mathematics learning outcome in finishing daily non-routine mathematics problem with precise procedure. This is in line with research findings done by Ndiung, Dantes, Ardana and Marhaeni [24]. They claimed that the integration of three stages of the Treffinger creative learning model with RME principles enables the construction of students' creative thinking skills. Hence, through this research, the combination of the Treffinger learning model stages and RME principles be able to develop students' mathematics learning outcomes in finishing non-routine questions.

III. METHOD

A. *Design*

This study was quasi-experiment research with a post-test only control group design. The study was aimed at investigating the difference in mathematics learning outcomes between the experiment group and the control group. The experiment group was treated with the Treffinger learning model with RME principles, while the control group was treated with the conventional learning model. This study consisted of three stages, i.e., pre-experiment, experiment, and post-experiment. The treatment was done in eight meetings, both for the experiment group and the control group, which was then ended with a post-test to measure the students' mathematics learning outcome.

B. *Population and Sample*

The population of this study consisted of all the fifth-grade students throughout Lelak district, with a total of 11 schools

(n= 383). The sampling was done using a random sampling technique. The sample of the study consisted of SDI Watu Weri and SDN Weri Pateng (n=101). SDI Watu Weri was used as an experiment group and SDI Weri Pateng as the control group. During the treatment, the students solved problems, both individually and in the group, using a student’s worksheet on the topic of fraction operation.

C. Data Collection and Analysis

The data mathematics learning outcome of the students was collected with essay tests; each consisted of 5 items. Five experts were validating content validity of the test instrument for measuring mathematics learning outcome with doctor qualifications from the Postgraduate Study of Universitas Pendidikan Ganesha, Bali analyzed by content validity ratio (CVR) developed by Lawshe [25]. The instrument used has been validated, and its reliabilities have been tested empirically. The reliability coefficient of the learning outcome was 0.79 and was tested using the Alpha Cronbach formula. The numeric ability test has 35 multiple choice items (reliability = 0.79). The data were analyzed using the Analysis

of Covariate (ANCOVA) that was preceded by the assumption tests, i.e., distribution normality test and group homogeneity variance test aided with Statistical Package for the Social Sciences (SPSS) for windows version 23.0.

IV. FINDINGS

The hypotheses tested in this study were 1) the mathematics learning outcome of the students who learned mathematics through the Treffinger learning model with RME principles is higher than that of those who learned mathematics through the conventional learning model; 2) the mathematics learning outcome of the students who learned mathematics through the Treffinger learning model with RME principles is higher than that of those who learned through the conventional learning model after numeric ability is controlled, and 3) there is a contribution of numeric ability to the students’ mathematics learning outcome. The result of descriptive statistical analysis can be seen in Table 1.

TABLE I. RECAP OF DESCRIPTIVE STATISTICAL ANALYSIS

Variable	Group	N	Mean	Median	Standard Deviation	Var.	Range	Min	Max
Mathematics Learning Outcome	Experiment	51	57,94	57	8,89	79,17	32	38	70
	Control	50	51,2	51	7,42	55,13	33	35	68
Numeric Ability	Experiment	51	68,78	69	7,37	54,33	34	46	80
	Control	50	68,52	69	7,29	53,15	32	51	83

Based on the data in Table 1 above, it can be said that the mean score for mathematics learning outcomes of the students who learned mathematics through the Treffinger learning model with RME principles is higher than those who learned mathematics through the conventional learning model. Then, assumption tests were conducted, i.e., data distribution normality test, data group variance homogeneity test, and data

linearity test. Based on the result of the assumption, tests were obtained that the sig values of the data are higher than 0.05. Thus, it can be said that the data have a normal distribution, homogeneous variance, and have a linear regression. From the test, the first hypothesis, variance analysis using SPSS 23.0, can be seen in Table 2 below.

TABLE II. RECAP OF VARIANCE ANALYSIS

Tests of Between-Subjects Effects						
Dependent Variable: Mathematics Learning Outcome						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	
Corrected Model	1155.492 ^a	1	1155.492	28.143	< .001	
Intercept	458264.086	1	458264.086	1.1164	< .001	
Learning Model	1155.492	1	1155.492	28.143	< .001	
Error	4064.666	99	41.057			
Total	463985.000	101				
Corrected Total	5220.158	100				
a. R Squared = ,221 (Adjusted R Squared = ,213)						

References to analysis it was obtained that Fobs. = 28. 143 and sig. value < 0.001. Since sig < 0.05, then it can be concluded that the mathematics learning outcome of the students who learned mathematics through the Treffinger

learning model with RME principles is higher than that of those who learned through the conventional learning model. The result of the testing of the second hypothesis can be seen in Table 3 below.

TABLE III. RECAP OF THE COVARIATE ANALYSIS

Tests of Between-Subjects Effects					
Dependent Variable: Mathematics Learning Outcome					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2855.083a	2	1427.542	59.152	< 0.001
Intercept	272.104	1	272.104	11.275	.001
X	1699.591	1	1699.591	70.425	< 0.001
Grup	1106.832	1	1106.832	45.863	< 0.001
Error	2365.075	98	24.133		
Total	463985.000	101			
Corrected Total	5220.158	100			

a. R Squared = .547 (Adjusted R Squared = .538)

Based on the data described above table, it is obtained that the F-value = 45.863 and sig = 0.001. By looking at the sig value < 0.05 it means that the students' creative skill of the students who learned mathematics through the Treffinger learning model with RME principles is higher than that of

those who learned mathematics through the conventional learning model after the numeric ability is controlled. The multitude of the contribution of numeric ability to creative thinking can be seen in Table 4.

TABLE IV. CONTRIBUTION OF NUMERICAL ABILITY

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.460 ^a	.211	.205	7.66094

a. Predictors: (Constant), Numerical ability

Then the result of the analysis shows that numeric ability gives a $0.205 \times 100\% = 20.5\%$ contribution to students' mathematics learning outcome. It means that a variation in mathematics learning outcome is around 20.5%, which can be accounted for by the numeric ability covariate, and the rest by other variables that were not investigated.

V. DISCUSSION

The prime aim of this research is to analyze the effect of the Treffinger learning model with RME principles on the development of students' mathematics learning outcomes, after controlling numeric ability. The research result shows that the Treffinger learning model with RME principles has a significant effect on students' mathematics learning outcomes after controlling numeric ability. This result indicates that mathematics learning outcome is determined by the teacher's ability to create learning activities which must be suitable with students' needs. The most important point in creating those learning activities is finding a suitable learning model, which is relevant to learning material. The Treffinger learning model with RME principles is able to construct students' mathematics competency. The integration between them is strongly relevant, particularly in fraction material learning in the fifth grade of primary school.

The positive and significant results, as stated, are the success of the integration of three stages of the Treffinger learning model and six principles of RME. At the basic tools stage, students manipulated the folding paper props to make an easier understanding of the problem given and reality principles, which link the realistic problem into fraction

counting operation learning through the assistance of props. In this stage, students were able to finish accurately the realistic problem proposed by the teacher. The habituation at the basic tools stage can lead students to finish non-routine questions systematically. It is also well performed by students in finishing the item tests that are based on their understanding level. At the practice with process stage, some of RME principles were applied, such as interaction principle, which is indicated in the group discussion activity; reality principle, which is indicated by students' activity in manipulating the folding paper props to facilitate their understanding about fraction counting operation; and interaction principle, which is performed by students who involved actively in finishing the problem in the group discussion. Group discussion division was based on students' abilities, and each group consisted of four-five persons.

Group classification that based on students' ability is done in order that students can interact with each other, communicate their idea or thought and respect the difference to the diversity, so students who have low ability might learn from those who have the high ability. This is in line with Vygotsky's ZPD concept. Vygotsky said that ZPD (zone of proximal development) is a zone where students might not be able to master difficult tasks alone, but those tasks might be mastered through the other guidance and assistance from the adults or students who have more skilled [26]. In this case, ZPD is the distance between the actual development level, which is indicated by the ability in solving the problem independently and level of potential development ability, which is indicated by ability in solving the problem by

assisting from adults or collaborate with peers who have more capable [27].

Vygotsky ZPD concept above-mentioned is relevant during group discussion activity, where students interact with each other, communicate their idea or thought actively, and give the responses given by their peers. In the interaction and activity principle, students have a positive interaction, which is mirrored by how students respect different ideas, then those ideas are concluded as group discussion results. This is affirmed by Treffinger [28], who said that creative learning is a communicative learning process that enables to create an enjoyable learning atmosphere for the students. The habituation of learning activity at the practice with the process stage can guide the students for constructing their creative thinking skills from the originality perspective. Vygotsky ZPD concept mentioned is relevant to the group discussion activity. During the discussion, students interact with each other and involved actively in solving the problem of fraction counting operation (summation, reduction, multiplication, and fraction division). Here, students can determine by themselves the way of problem-solving with alternative solutions, which is based upon the knowledge they already possessed. For example, use the picture, diagram, or even pattern either in the add up and subtract fraction by equating the denominator or on the multiplication and division of fraction [29]. Besides that, students communicate with each other and respect the different ideas; other than that, underprivileged students can ask their peers who have more capacity. And when students are unable to solve the problem, they communicate it with their teacher immediately. Learning activity by involving students actively, linking realistic problem with the concept being learned can help students to store the knowledge in the long-term memory. Through this learning activity, students are able to solve the non-routine problems.

At the working with real problems stage, the RME principles used are the guidance principles and braid principles. Through teacher guidance, students can construct the questions, answer those questions independently, and group. Then braid principle is undertaken by linking students' prior knowledge, particularly the knowledge about fractions. Research result conducted by Cortina, Višňovská and Zúñiga [30] indicated that in introducing the fraction toward students, particularly prior concept about the fraction can be used the alternative ways which are able to solve real problem gradually through informal problem-solving process before going to the formal problem-solving. In this case, one problem made by students can be solved with a variety of possible solutions, begin from the concrete stage until the abstract stage. When a problem can be well solved informally, then students may continue at the formal stage. For example, symbolically, students can define the fraction in the different denominators. This learning stage helps the students not just doing the demonstration, but what is being learned is significant and can be stored at their long-term memory.

Learning through Treffinger learning model with RME principles are able to lead students finishing non-routine problem that students did not experience previously. Students are always asked to finish routine questions that do not need a higher thinking level to finish those questions. Here, students

can finish the problem well because they have better ability about basic counting operation and fraction counting operation. From the description-mentioned, it is obvious that to master mathematics material, students must master some basic prior ability as a starting point in fraction learning. Afterward, students must be able to associate new knowledge and previous knowledge that ever learned. Teachers are asked to consider the stages of students' cognitive development in supporting students' intellectual skills in learning something (for instance, a concept of mathematics). The internalization process can be occurred seriously (means learning process occurred optimally) if the knowledge being learned is learned in three stages model, i.e., enactive stage model (concrete stage), iconic stage model (semi-concrete stage), and abstract stage model [31].

The result of this research is in line with the research conducted by Kızıltoprak and Köse [15]. They found out that mathematics is an important component to develop mathematics skills which is needed by everybody in solving daily life problems. They further disclosed that there is an interaction between basic arithmetic concept and thinking relational; students' development concept is associated with the arithmetic operation, such as summation, reduction, multiplication, and division. This research also supports the research result conducted by Pica, Marhaeni, and Dantes [32], who claimed that there is a numeric ability contribution toward students' mathematics learning results. The co-variable contribution of numeric ability toward students' mathematics learning outcome gives 10,6%. Research results conducted by Muntiar, Candiasa, and Dantes [19] also indicated that there is an interaction effect between RME principles and numeric ability toward mathematics learning outcomes. The research results above-mentioned indicate that numerical ability has a contribution toward students' various mathematics learning outcomes, so it is suitable to be controlled its effect.

After students' numerical ability is controlled, students' mathematics learning outcome and creative thinking skills who taught by using the Treffinger learning model with RME principles are better than those taught by using the conventional learning model. These results indicate that Treffinger learning model with RME principles has a positive effect on students' mathematics learning outcome.

VI. CONCLUSION

The research finding supported the theory and the previous researches stating that implementation of the Treffinger learning model with RME principles effective toward students' mathematics learning outcome. This is indicated by the development of students' mathematics learning outcomes of the experiment group in solving non-routine item tests that relevant to the fraction. The findings of this study showed that 1) the mathematics learning outcome of the students who learned mathematics through Treffinger learning model with RME principles was higher than that of those who learned through the conventional learning model; 2) the mathematics learning outcome of the students who learned through Treffinger creative learning model with RME principles was higher than that of those who learned through the conventional learning model after controlling numerical ability, and 3) there was a 20.5% contribution of numeric ability to the students'

mathematics learning outcome. The most strategic stages in the Treffinger learning model in guiding students' ability to solve the problem are the basic tools stage. This stage accommodates a variety of new notions and understands lots of ways in solving the problem. This stage as a foundation in developing functions and basic ability, either cognitive domain or affective domain. On the affective domain, including readiness to answer, openness toward experiences, readiness to accept similarity or ambiguity, sensitivity toward problem and challenge, eagerness, bravery in the risk-taking, awareness, and self-confidence. Meanwhile, the cognitive domain, through its learning, proposes the real problem (question) for students that appropriate with their experience and knowledge level so that students involved promptly in meaningful learning by answering more than one way. If the way to develop a creative notion for finding some solutions is successful, so it is approximately more than half will be successful for the next stages. Based upon the findings, this research strongly recommended being continued on the subject of the fraction or other materials at primary schools.

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