

INTERNATIONAL SEMINAR COMMITTE FACULTY OF TEACHER TRAINING AND EDUCATION UNIVERSITY OF BENGKULU

Jalan WR Supratman Kandang Limun Bengkulu Phone/Fax : +62736-21186 web: fkip.unib.ac.id e-mail: fkip@unib.ac.id

Certificate of Appreciation

No. 053/305/UN30.7/ISoE/2015

This certificate is awarded to :

SALEH HAJI

as

Presenter In recognition of valuable contribution to

THE 2015 - INTERNATIONAL SEMINAR ON EDUCATION

Organized by the Faculty of Teacher Training and Education, Bengkulu University, with the theme "The Uniqueness of Educational Practices towards Harmonization of the ASEAN Community in 2015" on January 16th- 18th, 2015 at Bengkulu - Indonesia

Dean of Faculty of Teacher's Training and Education,

Prof. Dr. Rambat Nur Sasongko, M.Pd

NIP 19611207 198601 1 001

Bengkulu, January 18th, 2015 Head of Organizing Committee,



Prof. Dr. Bambang Sahono, M.Pd. NIP 19591015 198503 1 016

PROCEEDING THE 2015 INTERNATIONAL SEMINAR ON EDUCATION

Theme:

"The Uniqueness of Educational Practices towards Harmonization of the ASEAN Community in 2015"

ISBN: 978-602-8043-43-4

Organized by

Faculty of Teacher Training and Education University of Bengkulu, Indonesia, joint with Communication Forum State Faculty of Teacher Training and Education Indonesia, and School of Education in ASEAN Countries

Grage Horizon Hotel, Bengkulu, Indonesia 16-18 January 2015





B-57

PROCEEDING

THE 2015 INTERNATIONAL SEMINAR ON EDUCATION

ADVISORY BOARD

Chairman: Prof. Dr. RambatNurSasongko, M.Pd. (UNIB Indonesia)
Members: Prof. Dr. BambangSahono, M.Pd. (UNIB Indonesia)
Prof. Allan L. White, Ph.D. (University Western Sidney Australia)
Prof. Dr. Tg. SifzizulTengku Muhammad (University MalaysiaTerengganu)
Prof. Dr. Chaterine E. Mathew (Univ of North Carolina at Greensboro USA)
Dr. Azwandi, MA (UNIB Indonesia)
Drs. AgusSusanta, MA, Ph.D. (UNIB Indonesia)
Communication Forum State Faculty of Teacher Training and Education, Indonesia
School of Education in ASEAN Countries

EDITORIAL BOARD

Chief Editor : Prof. Safnil, MA, Ph.D. (UNIB Indonesia) Members : Prof. Dr. Totok Sumaryanto F, M.Pd. (Universitas Negeri Semarang)

Prof. Dr. Rohiat, M.Pd. (UNIB Indonesia) Prof. Dr. Badeni, M.A. (UNIB Indonesia)

MANAGING EDITOR

M. Lutfi Firdaus, Ph.D. Dr. Susetyo, M.Pd. Dr. I Wayan Dharmayana, M.Psi.

ORGANIZED BY

Faculty of Teacher Training and Education University of Bengkulu, Indonesia, Joint with Communication Forum State Faculty of Teacher Training and Education Indonesia, and School of Education in ASEAN Countries

©FKIP University Press 2015

The publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of anypart may take place without the written permission of FKIP University Press.

ISBN 978-602-8043-43-4

TABLE OF CONTENTS

Cover inside	ii
Forward from Dean	iii
Forward from Editors	v
Table of contents	vi
Chapter I: Education in General	
THE EFFORTS TO IMPROVE FULFILLMENT OF THE NATIONAL EDUCATION STANDARDS THROUGH DEVELOPING MODEL OF SCHOOL MANAGEMENT BASED COLLABORATION, Rambat Nur Sasongko and Bambang Sahono	1
MUSICAL INSTRUMENTAL MODULE IN MALAYSIA SECONDARY SCHOOL, Mubin Md Nor and Kamaruddin Ilias	8
EFECTIVITY OF REB COUNSELING AND RELIGIOUS COUNSELING TO CHANGE THE STUDENTS SMOKING BEHAVIOR OF VOCATIONAL SCHOOL (SMK) KARYA GUNA SOUTH OF JAKARTA, Asni dan Rahmiwati Marsinun	14
GREEN SCHOOL IN PERSPECTIVE PHYSICALLY, PSYCHOLOGICALLY AND PEDAGOGICALLY OF IMPLEMENTING THEMATIC LEARNING IN PRIMARY SCHOOL, Marzuki	20
THE COMPARISON OF ELEMENTARY SCHOOL STUDENT ACHIEVEMENT THROUGH THEMATIC INTEGRATIVE AND SAINTIFIC APPROACH USED INQUIRY LEARNING, PROBLEM-BASED LEARNING TYPE SSCS, AND INTERACTIVE LEARNING IN FOURTH GRADE IN BENGKULU CITY, Endang Widi Winarni And Feri Noperman	27
SCHOLARSHIP OF TEACHING AND LEARNNG FOR FOSTERING LEARNING PERFORMANCE, Nyimas Triyana Safitri	32
THE ROLES OF SELF-EFFICACY AND SELF-REGULATED LEARNING TOWARD THE ANXIETY IN FACING NATIONAL EXAMINATION, I Wayan Dharmayana and Mu"arif Dwi Suryatama	40
IMPLEMENTATION OF INTEGRATED THEMATIC LEARNING WITH HUMILITY Sri Utami	46
THE EFFECT OF INSRTRUCTIONAL STRATEGY AND COGNITIVE STYLE ON LEARNING OUTCOMES IN SCIENCE, Johanes Sapri	53
THE ISLAMIC KINDERGARTEN PRINCIPALS "LEADERSHIP: THE LEVEL OF EDUCATIONAL BACKGROUND AND UNDERSTANDING ON MANAGING ISLAMIC EDUCATIONAL INSTITUTION TOWARD PRINCIPALS" PERFORMANCE	
Elly Istito'ah	60

THE RELATIONSHIF BETWEEN MOTIVATION, ORGANIZATION COMMITMEN AND CLIMATES ON LECTURE PERFORMANCE TO INCREASE ACADEMIC POSITION AT UNIVERSITY OF BENGKULU, Susetyo and Lulu Anastesi Sayekti	65
MAPPING OF ELEMENTARY SCHOOL STUDENT SCIENTIFIC INQUIRY ATTITUDE PATTERN IN BENGKULU CITY, Feri Noperman	71
APPLYING EDUTAINMENT METHOD TO ENHANCING EARLY CHILHOOD LANGUANGE SKILL, Nesna Agustriana	77
PEMBINAAN INSTRUMEN KESEJAHTERAAN SEKOLAH DI MALAYSIA Kamaruddin bin ilias, Nek Kamal Yeop Yunus, and Che Mohd Zulkifli Che Omar	80
IMPLEMENTATION MODEL OF DISCOVERY LEARNING TO INPROVE THE LINGUISTIC AND NATURALIST INTELEGENCES IN EARLY CHILDHOOD INTRUCTION, Nina Kurniah	93
ACADEMIC CULTURE CHANGE AND QUALITY ASSURANCE SYSTEM AT POSTGRADUATE INTEGRATED AT FACULTY (CASE STUDY AT FIA UB AND FTI ITB), Asep Sunandar	98
THE ASPIRE MODEL AND THE CURRICULUM REFORM IN INDONESIA: A PERSPECTIVE, Asnawi. R. and Amirul Mukminin	110
STUDY ON THE IMPLEMENTATION OF TEACHING PHYSICAL EDUCATION SCHOOLS IN MALAYSIA INDIGENOUS PENAN, Abang Ismail Bin Abang Haji Julhi, Mohd. Mahdi Abdullah and Lucy Rossy Sylvester Wahed Bujang Mi	116
THE INFLUENCE OF TEACHER PERSONALITY COMPETENCE TOWARD WORK MOTIVATION AND PERFORMANCE AMONG TEACHER AT STATE HIGH JUNIOR HIGH SCHOOL IN CITY OF MEDAN Nasrun	128
PENTAKSIRAN DI PRASEKOLAH PENDIDIKAN KHAS (PAKK@PAUD) : ISU, CABARAN DAN AMALAN GURU, Mohamed Ayob Hj Sukani and Arfah Hj Abd Karim	135
EDUCATING ENTREPRENEURS: THE CHALLENGES ON ENTREPRENEUR-SHIP EDUCATION AND CREATIVE INDUSTRIES FOR THE ASEAN ECONOMY COMMUNITY, Muazza	145
CHILDREN CHARACTER BUILDING THROUGH SNAKE AND LADDERS GAME E. Prima.K	150
PENINGKATAN MUTU PENDIDIKAN BAHASA, SENI DAN BUDAYA, BENTUK HARMONISASI DAN KESIAPAN MAYARAKAT ASEAN 2015, Suryadi	155
MANAJEMEN SEKOLAH BERBASIS PARTISIPATIF DALAM PENINGKATAN NILAI AKREDITASI SEKOLAH, Salmi	162
SATISFACTION OF SCHOOL ADMINISTRATORS TOWARDS BEGINNING TEACHERS, Badrul Hisham bin Alang Osman And Mubin bin Md Nor	174

PROMOTING TEACHERS" DISCIPLINE THROUGH TEACHERS" PERSONALITY

COMPETENCE MANAGEMENT: A PRELIMINARY STUDY, Nurhadi Priyanto187
EFFORTS O FPRINCIPAL TEACHERS AND PARENTS OF STUDENTS APPLYING CHARACTER EDUCATION IN SCHOOLS
Herasni Yaman, Erwin Bakti, and Holijah AR194
GOVERNMENT POLICY ON PONDOK PESANTREN IN JAMBI: A PRELIMINARY STUDY ON CHALLENGES AND STRATEGIES, Arif Abidin
THE HANDLING OF JUVENILE DELINQUENCY THROUGH THE ARRANGEMENT OF SENIOR SECONDARY SCHOOL (SMA) ISLAMIC EDUCATION CURRICULUM", AIMED AT FORMULATING THE LESSON PLAN, Pudjo Sumedi, Abdurrahman Gani, H.Ridjaluddin and Hj. IhsanaEl Khuluqo
ACADEMIC SUPERVISION OF IMPLEMENTATION THE 2013 CURRICULUM (DESCRIPTIVE STUDY AT SMPN 5 PONDOK KELAPA BENTENG REGION)
Koniat and Salastri Kohiat
PRINCIPALS FUNCTION TO IMPROVING THE PERFORMANCE OF A COMPUTER LABORATORIUM MANAGER (EVALUATION STUDY IN SMAN 1 PUTRI HIJAU NORT OF BENGKULU), Hakman Pawiran Sarim
EDUCATION AS A DETERMINATIVE FACTOR TOWARD THE SUCCESS OF ECONOMIC DEVELOPMENT (A CASE STUDY ON GRADUATES OF VOCATIONAL SCHOOL IN PONTIANAK CITY), Junaidi H. Matsum
THE CONTRIBUTION OF THE WORKSHOP MANAGEMENT OF PUBLIC VOCATIONAL TO UNIT PRODUCTION INCOME (STUDY IN SMK NEGERI 2 ARGAMAKMUR), Ruskan
SAVING INDONESIANS THROUGH COMMUNITY-BASED EDUCATION: POLICY AND IMPLEMENTATION, Novri Suryadi
STANDARDIZED EXAM POLICY IN INDONESIA: IMPACTS, POLICY
ALTERNATIVES AND POLICY REFORM, Asmoni and Eddy Haryanto
SOCIAL JUSTICE AND EDUCATIONAL POLICY: EDUCATING WORKING CHILDREN AND CHILD LABOUR IN INDONESIA, Sri Murni and Amirul Mukminin253
IMPLEMENTATION OF AUTHENTIC ASSESSMENT IN THE VISUAL ARTS EDUCATIONIN SECONDARY SCHOOL, Che Aleha bt Ladin and Munirah bt Abd Hamid
MANAGING STUDENTS" LEARNING INTERESTS IN ACCOUNTING SUBJECT THROUGH TEACHERS" COMMUNICATION SKILLS AND TEACHING VARIATIONS: A CASE STUDY AT ONE SENIOR HIGH SCHOOL IN JAMBI CITY, Robin Pratama and
Rahmat Murboyono
ANALISIS KINERJA GURU (STUDI KORELASIONAL ANTARA KOMPETENSI DENGAN KINERJA GURU SUKU DINAS PENDIDIKAN DASAR KOTA ADMINISTRASI JAKARTA TIMUR.D. M. Dharmawati
270

TINJAUAN PANDANGAN GURU PRA PERKHIDMATAN DAN GURU DALAM PERKHIDMATAN TENTANG PELAKSANAAN PENDEKATAN PEMBELAJARAN

LUAR BILIK DARJAH DALAM PENDIDIKAN SIVIK DAN KEWARGANEGARAAN Haminah Suhaibo	279
FROM THEORY TO PRACTICE: TOTAL QUALITY MANAGEMENT AND STUDENT SERVICE IN HIGHER EDUCATION, Nelly Herwani	289
THE DETERMINANT VARIABLES WHICH DETERMINE THE TEACHING EFFICACY OF ECONOMICS TEACHERS CANDIDATES IN FACING AEC 2015, Nurdian Susilowati, Lyna Latifah, & Harnanik	294
INFORMATION AND MOTIVATION MANAGEMENT: VOCATIONAL SCHOOL STUDENTS" INTEREST IN CHOOSING HOME ECONOMICS DEPARTMENT AT ONE PUBLIC UNIVERSITY IN WEST SUMATRA, Woro Handayani	300
TEACHING IN THE AGE OF SCHOOL-BASED MANAGEMENT POLICY: DUAL INTELLIGENCE AND STUDENTS" ATTITUDES ON THE TENTH GRADE STUDENTS ACHIEVEMENT IN ECONOMIC SUBJECT AT ONE STATE SENIOR HIGH SCHOOL IN MUARO JAMBL Robi Hendro	210
MANAGING VOCATIONAL SCHOOL STUDENTS" ENTREPRENEURSHIP INTEREST:	
LEARNING ACHIEVEMENT IN ENTREPRENEURSHIP TRAINING COURSE AND STUDENTS" MOTIVATION IN CHOOSING A BUSINESS ADMINISTRATION MAJOR Rosmiati	317
THE PATTERNS OF CLASSROOM INTERACTION IN ONE PUBLIC SENIOR HIGH SCHOOL IN JAMBI, MukhlashAbrar, M.Hum.	.325
Chapter II: Science Education	
THE ANALYSIS OF MATHEMATICAL VALUES IN YEAR 7 VICTORIAN MATHEMATICS TEXTBOOKS, Dewi Rahimah and Barbara Clarke	. 332
AN ANALYSIS OF THE DEVELOPMENT OF SELF (SELF-DEVELOPMENT) HIGH SCHOOL STUDENT ON MATH, Ishaq Nuriadin	. 339
EFFECTIVENESS APPROACH CAUSAL RELATIONSHIP FIGURAL CONCEPTS	
AND LEARNING MATHEMATICS STUDENT IN SMP BENGKULU CITY,	
AND LEARNING MATHEMATICS STUDENT IN SMP BENGKULU CITY, Zamzaili	. 347
AND LEARNING MATHEMATICS STUDENT IN SMP BENGKULU CITY, Zamzaili CLASSROOM ACTION RESEARCH ON THE USE OF ICT AS ALTERNATIVE APPROACH; EFFECTIVE OR INEFFECTIVE?, Yusnidar Yusuf	. 347
AND LEARNING MATHEMATICS STUDENT IN SMP BENGKULU CITY, Zamzaili	. 347 . 352
AND LEARNING MATHEMATICS STUDENT IN SMP BENGKULU CITY, Zamzaili	. 347 . 352 . 357
AND LEARNING MATHEMATICS STUDENT IN SMP BENGKULU CITY, Zamzaili	. 347 . 352 . 357
AND LEARNING MATHEMATICS STUDENT IN SMP BENGKULU CITY, Zamzaili	. 347 . 352 . 357 . 362
AND LEARNING MATHEMATICS STUDENT IN SMP BENGKULU CITY, Zamzaili	. 347 . 352 . 357 . 362
AND LEARNING MATHEMATICS STUDENT IN SMP BENGKULU CITY, Zamzaili	. 347 . 352 . 357 . 362 . 372

DEVELOPMENT BASED ON MICROSOFT POWERPOINT APPLICATION, Dewi Handayani and Agus Sundaryono	37
DEVELOPING STUDENTS" MATHEMATICAL REASONING THROUGH	
REALISTIC MATHEMATICS LEARNING BASED ON OPEN-ENDED PROBLEM,	149.1
Saleh Haji	38
IMPROVING STUDENT" UNDERSTANDING IN CONCEPTS PHYSICS AND	No. No. of Concession, Name
PROBLEM SOLVING SKILLS OF STUDENTS OF PHYSICS EDUCATION	
STUDENT AT BENGKULU UNIVERSITY, Eko Swistoro Warimun	39
APPLICATION OF CONNECTING ORGANIZING REFLECTING AND	
EXTENDING (CORE) I FARNING TO IMPROVE CRITICAL THINKING SKILLS	
IN MATHEMATICS Yumiati Yaya S Kusumah Didi Survadi and Jarnawi Afgani	
Dahlan	39
BURDAUDIC HICH SCHOOL DIVISIOS DISTRUCTION THROUGH LESSON	
STUDY MODEL IN A CEU DROVINCE Divisi and Melving	40
STOPT MODEL IN ACCH PROVINCE, Djuli and Mervina	40
WITH RME KOMBINATORIK LEARNING IN SECONDARY SCHOOL BECOMES	
INTERESTING, Ervin Azhar, Ishaq Nuriadin and Nurafni	41
WAKING UP STUDENTS" LEARNING ENERGY USING INTERACTIVE MEDIA	
IN TEACHING SCIENCE THEMATICALLY, INTEGRATIVELY, AND	
CONTEXTUALLY, Nandang Hidayat and Teti Rostikawati	41
IMPROVING STUDENTS" LEARNING INDEPENDENCY IN ANIMAL	
STRUCTURE LECTURE USING COLABORATIVE APPROACH WITH LESSON	
STUDY BASED, R. Teti Rostikawati and Rita Istiana	42
POTENTIAL OF EXTRACT YOUNG LEAF SUNGKALAS AN ANTI	
PLASMODIUM, Agus MH Putranto, Ariefa Primair Yani and Rahmad Darmawan	42
DEVELODMENT OF DITED ACTIVE ICT DASED I FADNING MATEDIALS LISE	
SI IDESHOW POWERPOINT BY LISING AUDIO FEFECT FOR MATHEMATIC	
TEACHERS OF IUNIOR SCHOOL AT RURAL AREA KUBU WEST BORNEO	
Bambang Hudiono	43
THE EFFECT OF THE CONSUMPTION OF PURE RAW PETE EXTRACT (PARKIA	
SPECIOSA) TOWARD DIABETES MELLITUS TYPE 2 ON THE WHITE RAT	44
(RATTUS NOR VEGICUS), Budni H. Akbar and Mayarni	44
TEACHING MODEL MANAGEMENT: MAKE A MATCH LEARNING MODEL	
AND STUDENT ACHIEVEMENT IN SCIENCE IN ONE ELEMENTARY SCHOOL,	
MERSAM, BATANGHARI, JAMBI, Bestari	45
TEACHING MEDIA MANAGEMENT: IMPROVING STUDENTS" ACHIEVEMENT	

x

DEVELOPING STUDENTS' MATHEMATICAL REASONING THROUGH REALISTIC MATHEMATICS LEARNING BASED ON OPEN-ENDED PROBLEM

Saleh Haji

Coordinator of Mathematics Education Graduate Program, Faculty Of Education, Bengkulu University. E-mail: salehhaji25@gmail.com

ABSTRACT

The Purpose of this study is to determine the achievement and improvement of mathematical reasoning students" ability through Realistics Mathematics Learning Based on Open-Ended Problem (RML-OP). This study use a quasi-experimental design by the non-equivalent control group. The results are RML-OP more effectively in the achievement and improvement mathematical reasoning students" ability is compared conventional learning (CL). Differences achievement and improvement in both groups is significant. The magnitude of the achievement of students 'mathematical reasoning ability is taught through RML-OP is 75,63, while students 'mathematical reasoning students' ability is taught through CL is 64,63. While the magnitude of the increase in mathematical reasoning students' ability who is taught through RML-OP is 0,62, while mathematical reasoning students' ability is taught through CL is 0,41.

Keywords: Mathematical reasoning ability, realistic mathematics learning, open-ended problem.

1. INTRODUCTION

1.1. Backround

Reasoning ability of students is less developed optimally through learning mathematics teachers do today. Students tend to memorize the definition of a mathematical concept without understanding. Similarly, students tend to memorize the steps (algorithm) to solve a mathematical problem, without any understanding. Understanding is an important element in building the capability of reasoning. Reasoning ability is one's ability to be achieved through the mathematical learning National Council of Teachers of Mathematics (2000) mentions that the mathematical reasoning and proof offer powerful ways of developing and expressing insights about a widw range of phenomena.

One of the factors causing low reasoning ability students are learning model used by teachers in teaching mathematics. Mathematics learning model is needed by students to be able to master the ability to reason well. Students can develop the ability to reason well through realistic mathematics learning based on open-ended problem. Because the learning looked at mathematics as a human activity. According to Freudenthal (1971), mathematics must be connected to reality, stay close to your children and be relevant to society in oreder to be of human value.

1.2. The Research Problem

a. Is there an increase in students' reasoning skills are taught through realistic mathematics learning based on open-ended problem?

ISBN: 978-602-8043-43-4

b. Is student achievement reasoning skills are taught through realistic mathematics learning based on open-ended problem higher than usual ?

Realistic mathematics learning based on open-ended problem is mathematics learning that trigger students to solve an open-ended problem through discovery activities, reflection, and discussion. Students are given the freedom to use way to solve the problem. Students construct their own knowledge they have acquired.

Realistic mathematics learning is an approach to learning mathematics where the student should learn mathematics by mathematizing subject matter from realistic situations and by mathematizing reviews their own mathematical activity (Rasmussen, 2000). The approach emphasizes the activity of students in understanding the material mathematics through real situations through non-formal mathematics (horizontal mathematics) to the formal mathematics (vertical mathemativs). Teachers play a role guiding the student activities. The teacher directs students to use informal strategies towards a formal strategy. According Traffers (1987), teachers help the children to develop informal reviews their strategies into more formal approaches the which they can use in other than situasions. Realistic mathematics approaches have traits or characteristics as follows: (1) The use of context, (2) The use of models, (3) The use of student 's own productions and constructions, (4) The interactive character of teaching process, and (5) The intertwinement of various learning strands (De Lange, 1987).

The use of context in learning mathematics can lead students in the focus of a problem that will be sought after completion. Focusing is easier for students to draw a conclusion. In addition, the use of open contextual issues can make creative students in making a conclusion. Because of the open-ended problems have more than one correct answer. According Surif, Ibrahim, and Dalim (2013), the open-ended nutare of the questions indicates that there is no unique correct answer. The use of the model can facilitate students in understanding the relationship facts necessary to obtain valid conclusions. Freedom of students in constructing knowledge based upon the ability of the students initially provided more flexibility in reasoning. Interactivity in teaching provides the opportunity for students to share ideas in finding a valid conclusion. Variations of learning can reduce the saturation of students in finding a valid conclusion based on the facts.

The characteristics of realistic mathematics learning is based on 3 principles. RME has three principles: 1. Re-invention and progressive mathematization, 2. Didactical phenomenology and 3. Self-developed models (Gravemeijer, 1994). The RME principles emphasizes discovery activity is an activity that is very important to students in obtaining the settlement of a problem and to understand a concept or discover new knowledge.

Some research indicates that the PMR successfully develop students' mathematical abilities. Freudenthal (1991) suggested that a conducive learning environment enables students to construct mathematical knowledge through RME. Van den Heuvel-Panhuizen (1996) research results mentions that the Realistic Mathematics Education (RME) can help students learn well about the topic percentage. Gravemeijer & Doorman (1999) suggested that contextual issues in RME can assist students in understanding the calculus.

The reason ability is very important for students to understand mathematical material. Because the mathematics associated with everyday life. According to Hersh (1997), mathematics is a form of life. As Pythagoras theorem deals with the measurement of the length of the ladder leaning on a wall. The daily life problems solution requires a good ability to reason, as evidence in a court case. In addition, the ability to reason is needed also to be able to understand the material in other disciplines including linguistics. Physics using mathematical reasoning to formulate the relationship between speed, distance and time as $v = \frac{s}{t}$. Linguistics using mathematical reasoning to formulate the form of a sentence with SPOK symbol (Subject, Predicate, Object, Specification)

Efforts to improve students' reasoning ability has been pursued by several researchers. Lither (2004) found that students' mathematical reasoning capabilities can be built through a veriety of exercises contained in the calculus text book. While other researchers and Weening Quan & Weening (1999) and Olson (2007) found that mathematical reasoning capabilities can be

ISEN: 978-602-8043-43-4

built through learning the game. While Spencer (1989) build mathematical reasoning skills students through verbal analysis.

Russell (1999) explains that mathematical reasoning is basically related to the development, justification and the use of mathematical generalization. Generalization of an object logically inferred through some facts. The generalization process indicates the development of a relevant fact of the facts with other facts. Proper generalization inference is an indicator of the justification of a reasoning.

Mathematical reasoning related to mathematical objects. Such objects are facts, concepts, principles, and skills. Brodie (2004) explains that mathematical reasoning is reasoning with regard to mathematical objects. The concept of circular reasoning are activities that relate the relationship between the variables of the center point, the radius of the other points. While in principle there is a reasoning activities relating to the relationships between concepts. Such as the area of the rectangle associated with the concept of length and width .

The usefulness of mathematical reasoning proposed by Ball and Bass (2003) mathematical reasoning is the basis of mathematical skills necessary to understand mathematical concepts, using ideas and flexible procedures and to construct mathematical knowledge. Mathematical concept includes a variety of relationships between variables. The understanding of relationship required the ability to reason. Similarly, the procedures for settling a problem in mathematics deals with the relationship between the step by step other settlement.

2. METHODOLOGY

2.1. The Sample and Population

The sample is students of class VIIA SMPN 15 Bengkulu City consisting of 21 students. The sample comes from a population of students of class VII SMP 15 Bengkulu City consisting of 90 students.

2.2. Instrument Validity and Realibility

The reasoning ability test consists of 5 items. The results of the analysis of reasoning ability tests using software Anates as follows:

Mean = 69.05 Raw intersection = 12.81 Correlation XY = 0.73 Reliability test = 0.84 Item test = 5 The number of subjects = 21 File name : D : \ YUMI 2014 \ PROBLEM SALEH HAJJ \ PROCESSED TRIAL \ PENALARAN.AUR

Table 1 Results of Validity and Realibility Instrument

Item	Т	DP(%)	Difficulty	Correlation	Significant
1	3,16	16,67	Very easy	0,933	Very significant
2	3,16	16,67	Medium	0,933	Very significant
3	4,39	37,50	Medium	0,862	Very significant
4	7,83	58,33	Medium	0,890	Very significant
5	1,86	12,50	Easy	0,214	SPCK synthetic

```
T Table (\alpha = 0.05) = 0.482 + 0.4 (0.423 - 0.482) = 0.458
```

ISBN: 978-602-8043-43-4

Based on the analysis results obtained Anates software instruments are valid and reliable reasoning ability as much as 4 items. So that the instrument can be used to measure students' reasoning abilities.

2.3. Research Design

This study use a quasi-experimental design by the non-equivalent control group (Cohen, Manion and Morrison, 2000):

Experimental	O1	X	O_2
Control	O3		O ₄

X is a treatment as realistic mathematics learning based on open-ended problem

2.4. Data Analysis

The analysis of achievement reasoning skills using Mann Whitney test, while the analysis of the increase in the ability of reasoning using the test N-Gein. The result of the requirements of normality and homogeneity of the data presented in Table 2 and Table 3 below.

Table 2. Results of Normality	Test Data Pretest, Posttest,	and N-gain Mathematical	Reasoning
Ability Students			

Data Group	N	Average	Standard Devision	Kolmogorov- Smirnov Z	Sig. (2-tail)	H ₀
Pretest KPM Experiment	27	36	10,08	0,853	0,461	Diterima
Pretest KPM Control	24	36,04	12,66	0,613	0,846	Received
Postes KPM Experiment	27	75,63	12,45	1,451	0,030	Rejected
Postes KPM Control	24	64,63	11,40	0,847	0,469	Received
N-gain KPM Experiment	27	0,62	0,17	0,928	0,356	Received
N-gain KPM Control	24	0,41	0,17	0,759	0,611	Received

The data were not normally distributed only posttest mathematical reasoning ability (KPM) for the experimental group, while other data are normally distributed. Thus, different test posttest KPM advance of experimental class and grade control using Mann Whitney test, while data pretest and N-gain needs to be tested first and homogeneity of variance.

 Table 3. Results of Homogeneity of Variance Pretest Data and N-gain

 Mathematical Reasoning Ability Students

Data Group	N	F	Sig. (2-tail)	H ₀	
Pretest KPM Experiment	27	3,686	0,061	Received	
Pretest KPM Control	24	and addition of a	alle seale the regard	a front approx	
N-gain KPM Experiment	27	0,411	0,524	Received	
N-gain KPM Control	24		sine seuropool pur Av	and search and the	

Based on the data in the Table 3, it can be concluded that all homogeneous data sets. Thus, different test pretest and N-graders gain KPM between experimental and control classes using t-test.

3. RESULTS AND DISCUSSION

3.1. Achievement of Mathematical Reasoning Ability

Achievement of mathematical reasoning skills students taught through realistic mathematics learning based on open-ended problem (PMR-OE) of 75.63 is greater than students taught through conventional teaching (PK) of 64.63. Students are taught through PMR-OE more careful in understanding the problem. Such problems in determining the integers a and b in which the value of 4a + 10b is 4×46 . Students understand ... coupled with $10 \times \dots$, so the result is 46. While the students in the control group formally understand the 4a + 10b = 46. In addition, the settlement of a matter which is carried by the experimental group students more rational and varied. $4 \times 4 = 16$, the result is added to the $10 \times 3 = 30$, so 16 + 10 = 46. Therefore, a = 4 and b = 3. Resolution as follows. $4 \times 9 = 36$ the results added $10 \times 1 = 10$, so 36 + 10 = 46. While problem solving undertaken by students who are taught through conventional learning more formal and one answer. Following completion. 4a + 10b = 46, 4a = 46 - 10b, in order to obtain a = 4 and b = 3.

Achievement of experimental reasoning abilities of students who are taught through PMR-OE higher than conventional learning, because PMR-OE using contextual issues that are open to be completed by the student. Students harnessing multiple sources of data to be able to resolve the problem. In addition, interactivity in pembelajara PMR-OE broaden students in scrutinizing the data and draw conclusions. Achievement of reasoning ability students who are taught through PMR-OE and conventional presented in Table 4 below.

Table 4. Calculati	on Results Student	t Achievement	KPM	between	Experiment	Group and	Control
Group							

Data Group	Average	U Mann Whitney	Z	sig.(2-tail)	H ₀
Postes KP Experiment	75,63	121.000	2.00	0.000	
Postes KP Control	64,63	- 131,000	-3,656	0,000	Rejected

Data group average Mann Whitney U Z sig . (2 - way) H0. Postes KP 75.63 131.000 -3.656 0.000 Experiments Denied. Postes Control KP 64.63.

Mann Whitney test results indicate that there are significant differences in achievement (posttest) KPM between students' experimental group and control group. Achievement KPM experimental group students is higher than the control group.

3.2. Improvement of Students Reasoning Ability

Increased KPM students taught through PMR-OE higher than students taught through PK. N-gain experimental group at 0.62, while the N-gain control group by 0.41. It shows a realistic mathematics learning based on open-ended problem a greater contribution to the students' reasoning ability compared with conventional learning. Learning PMR-OE provide rapid progress for students in understanding the problem and resolve the problem. This makes the improvement of students' reasoning skills are taught through PMR-OE higher than students taught through PK. Students are encouraged to think in understanding a problem. Students are invited to look for various ways to solve a problem. So that students have the ability to resolve issues like problems in

ISBN: 978-602-8043-43-4

$$2 , 3 , 5 , 8 , 13 , 20 31, 44, 61.$$

Table 5 Results of Calculation Test-t Pretest and N-gain Mathematical Reasoning Ability between Experiment Group and Control Group

Data Group	N	Average	Average Difference	t	df	Sig. (2-tail)	H ₀
Pretest KP Experiment	27	36	0,04	0,013	49	0,990	Accepted
Pretest KP Control	24	36,04					
N-gain KP Experiment	27	0,62	0,21	-3,961	49	0,000	Rejected
N-gain KP Control	24	0,41					

The way that students do as follows. At first he looked for the difference between two adjacent numbers. From the five numbers are known, the result that the difference of the two numbers are the closest form of primes started the first two terms. The resulting increase in the students' reasoning abilities are presented in Table 5.

Table 5 shows that there are differences in pretest scores between students KPM experimental group and control group. While the increase of (N-gain) KPM differ significantly between the two classes. The data showed an increase in student car loan experimental group higher than control group.

Achievement and improvement of students' reasoning skills are taught through PMR- OE and PK are presented in Figure 1 below.



Figure 1. Score Mathematical Reasoning Ability

4. CONCLUSION

Conclusions are as follow:

a. There is an increase in students' reasoning skills are taught through Realistic Mathematics Learning Based on Open-Ended Problem at 0,62.

ISBN: 978-602-8043-43-4

b. Achievement of students reasoning skills taught through Realistic Mathematics Learning Based on Open-Ended Problem higher than students taught through Conventional Learning. Achievement through Realistic Mathematics Learning Based on Open-Ended Problem at 75.63, while the achievement by Conventional Learning at 64.63.

Suggestions are as follow:

- a. To improve students' reasoning abilities, teachers should apply Realistic Mathematics Learning Based on Open-Ended Problem to giving an open problem challenging and interesting for students as well as creating an atmosphere of interactivity in learning.
- b. To achieve high reasoning ability of students, teachers should apply Realistic Mathematics Learning Based on Open-Ended Problem with emphasis on freedom of students using his own way in solving the problem.

REFERENCES

Ball dan Bass (2003). Making Mathematics Reasonable in School. National Council of Teachers of Mathematics, Reston, VA.

- Brodie, K. (2004). Teaching Mathematical Reasoning in Secondary School Classrooms. Netherlands: Springer.
- Cohen, L., Manion, L. and Morrison, K. (2000). Research Mathods in Education. London: Routledge Falmer.

De Lange, J. (1987). Mathematics, Insight and Meaning. Utrecht: OW&CO.

Freudenthal, H. (1971). "Geometry between the Devil and the Deep Sea". Educational Studies in Mathematics, 3, 413-435.

- Freudenthal, H. (1991). *Revisiting Mathematics Education*. China Lectures. The Nedherlands: Kluwer Academic Publishers, Dordrecht.
- Gravemeijer, K.P.E. (1994). Developing Realistic Mathematics Education. Utrecht: Freudenthal Institute.

Gravemeijer, K. & Doorman, M. (1999). Context Problems in Realistic Mathematics Education: A Calculus Course As an Example. *Educational Studies in Mathematics*, 39, 111-129.

Hers, R. (1997). What is Mathematics, Really? New York: Oxford University Press.

- Lithner, J. (2004). Mathematical Reasoning in Calculus Textbook Exercises. The Journal of Mathematical Behaviour. Vol 23, 405-427.
- National Council of Teachers of Mathematics (2000). Principles and Standards for School Mathematics. United States of America: Reston, VA.
- Olson, J.C. (2007). Developing Students" Mathematical Reasoning through Games. *Teaching Children Mathematics*. Vol. 13, 464-471.
- Quinn, A.L. & Weening, F. (1999). Developing Mathematical Reasoning Using Attribute Games. Mathematics Teacher. Vol. 92, 775-793.
- Rasmussen, C.L. (2000). Locating Starting Point in Differential Equations: A Realistic Mathematics Eduacation Approach. *International Journal of Mathematics Education in Science* and Technology. Vol. 31(2), 161-172.
- Russell, S.J. (1999). Mathematical Reasoning in The Elementary Grades. National Council of Teachers of Mathematics, Reston, VA.
- Spencer, C. (1989). Mathematical Reasoning through Verbal Analysis. The Arithmetic Teacher. Vol. 36, 33-34.
- Surif, J., Ibrahim, N.H., and Dalim, S.F. (2013). Problem Solving: Algorithms and Conceptual Problems. Sosial and Behavioral Sciences. 116(2014), 4955-4963.
- Traffers (1987). Three Dimentions, A Model of Goels in Theory Description in Mathematics Instruction. Dordrecht: Reidel Publishing Company.

ISBN: 978-602-8043-43-4

Van den Heuvel-Panhuizen, M. (1996). The Didactical Use of Models in Realistic Mathematics Education: An Example from a Longitudinal Trajectory on Percentage. *Educational Studies in Mathematics*, 27(4), 341-372.

