

PROCEEDING

ISBN: 978-602-8043-84-7



Bengkulu International Conference on Science and Education (BICSE - 2017)

**“Breaching international boundaries to
share scientific research and advance education”**

**Rectorate Building 3rd Floor, University of Bengkulu
December 14 – 15, 2017**

Invited Speakers:

**Dr. Corey Johnson
University of North Carolina–Greensboro, USA**

**Dr. Jay Lennartson
University of North Carolina–Greensboro, USA**

**Dr. Ian Singleton
PanEco Foundation, Switzerland**

**Organizer:
Fakultas Keguruan dan Ilmu Pendidikan
Universitas Bengkulu**



8 (2017)

Conference Proceeding BICSE - 2017, ISBN : 978-602-8043-84-7

Bengkulu International Conference on Science and Education (BICSE - 2017)

“Breaching international boundaries to share scientific research and advance education”

Chief editor: M. Lutfi Firdaus, Ph.D.

FKIP UNIB Press, 2018

ISBN: 978-602-8043-84-7

Editor : Annisa Puji Astuti, Hadi Apriyoanda

Layout : Hadi Apriyoanda

Cover Design : Deni Parlindungan

Publisher : **Unit Penerbitan dan Publikasi FKIP UNIB**

Address : Gedung Lab Pembelajaran FKIP Universitas Bengkulu, Jalan WR.
Supratman, Kandang Limun, Bengkulu 38371

All rights reserved

Reproduction of this work in any form and by any means without the written permission of the author is prohibited.

Bengkulu International Conference on Science and Education (BICSE - 2017)

“Breaching international boundaries to share scientific research and advance education”

Proceeding and Scientific Program: M. Lutfi Firdaus, Ph.D.

Dr. Agus Sundaryono

Dr. Aceng Ruyani

Editor : Annisa Puji Astuti, Hadi Apriyoanda

Layout : Hadi Apriyoanda

Cover Design : Deni Parlindungan

Scientific Committee:

1. Dr. Ade Gafar Abdullah, Universitas Pendidikan Indonesia
2. Dr. Eng. Asep Bayu DN, Universitas Pendidikan Indonesia
3. Dr. Zulfatman, Univ. Muhammadiyah Malang
4. Dr. Dyah Rini, Universitas Negeri Semarang
5. Dr. Andi Adriansyah, Universitas Mercu Buana
6. Dr. Permata Ika Hidayati, Universitas Kanjuruhan Malang
7. Lulu Purwaningrum, Ph.D, UNS Solo
8. Acep Purqon, Ph.D, Institut Teknologi Bandung
9. Dr. Yeni W. Hartati, Universitas Padjadjaran
10. Dr. Santhy Wyantuti, Universitas Padjadjaran
11. Dr. Diana Rakhmawaty Eddy, Universitas Padjadjaran

FKIP UNIB Press

Gedung Lab Pembelajaran FKIP UNIB, Jalan WR. Supratman, Kandang Limun, Bengkulu 38371

Tel: +62 736 21170 and 21884; Fax : +62 736 22105

Email: fkp@unib.ac.id

Website: <https://www.unib.ac.id>

ORGANIZING COMMITTEE

Chairman:

M. Lutfi Firdaus, Ph.D. – University of Bengkulu

Members:

- Dr. Agus Sundaryono – University of Bengkulu
- Dr. Aceng Ruyani – University of Bengkulu

Secretary

- Annisa Puji Astuti, M.Pd.Si
- Hadi Apriyoanda S.Pd
- Elvida Sari Yunilarosi S.Pd
- Juwita Megarani S.Pd
- Netria Septiayu S.Pd

Public Relation

- Arsela Eko Listiono, M.Pd.Si
- Muslih Muslihin, SE

Accommodation

- Pauzi Jundara, S.Pd
- Deni Parlindungan, M.Pd.Si

Event Program

- Deni Parlindungan, M.Pd.Si
- Sukaina Adibi
- Bagus Ariadi

Consumption

- Ria Kusuma Dewi, S.Kom
- Yopita Diana S.Pd
- Tyas S.Pd
- Nurin Al-Yanni S.Pd

Transportation

- Muslih Muslihin, SE
- Arsela Eko Listiono, M.Pd.Si

Website

- Annisa Puji Astuti, M.Pd.Si
- Ariyoga Pratama, S.Pd

Documentation

- Ariyoga Pratama, S.Pd
- Pauzi Jundara, S.Pd

Secretariat Address :

Graduate School of Science Education
Faculty of Teacher Training and Education
University of Bengkulu
Phone: (0736) 21186, Faxsimile: (0736) 21186
Website: www.fkip.unib.ac.id
Email: pascapendipa_unib@yahoo.co.id

TABLE OF CONTENTS

COVER.....	i
COPYRIGHT PAGE	ii
SCIENTIFIC COMMITTEE	iii
ORGANIZING COMMITTEE.....	iv
PREFACE FROM ORGANIZING COMMITTEE.....	v
PREFACE FROM PEER PROJECT.....	vi
GENERAL TIME SCHEDULE.....	viii
FLOOR PLAN	ix
TABLE OF CONTENTS.....	x
KEYNOTE SPEAKERS	1
Dr. Corey M. Johnson.....	1
Dr. G. Jay Lennartson.....	2
Dr. Ian Singleton.....	3
CONFERENCE PROCEEDINGS	4
1. Variability of Trace Metal Distributions (Cd, Pb, Mn, Cu and Zn) and Their Biogeochemical Cycles in the East China Sea and Coastal Areas, Japan.....	4
2. Local Culture of Serawai South Bengkulu District.....	9
3. Character Education For Early Childhood.....	17
4. Development Of Physics Chemistry Teaching Materials In Sriwijaya University Chemical Education Study Program Of Education Science And Teaching Faculty With Coal Briquettes - Household Waste Fibers	22
5. Exploring RELNs Epitopes Expressed on HER2 ⁺ Breast Cancer to Design B and CTL Associated Brain Metastases Cancer Vaccines Using Immunoinformatics Approach	29
6. Lesson Drawing With <i>Tat</i> Dyes.....	44
7. Landslides Model Due to Climate Change Using Digital Elevation Models (Dem) dnd Geoslop.....	54
8. Ethnobotanic Study Plants Mukomuko Bengkulu Making Products for the Development of Biology Based Materials Based On Local Potentials: "Plant Diversity"	59
9. The Effect of STAD Cooperative Learning and Expository Method and Learning Independence on Educational Statistics Learning Outcomes.....	68
10. Implementation of Mea Mathematics Learning to Improve Students Mathematical Reasoning Ability in Mechanical Engineering S1 University of Ratu Samban.....	82
11. Analysis of Herbaceous Strata Vegetation in Bukit Sulap Lubuklinggau	87
12. Analysis of Preparation of Processing of Palm Fruit <i>Elaeis guineensis Jacq</i> on Crende Palm Oil Crops (CPO) with Type Byhster Processing Equipment.....	93
13. The Utilization of Portfolio in The Biology Learning Assesment Process.....	96
14. Collage Students' Errors in Solving Volumes of Solids of Revolution Problems and The Scaffolding Given in Model Apos Learning.....	100

15. Effect of Natural Insecticide From Gadung (<i>Dioscorea hispida</i> Dennst) to Mosquito Mortality	108
16. The Implementation of Teams Games Tournament (TGT) Model toward the Learning Result of IPA Terpadu at the Seventh Grade Students of SMP Negeri 13 Lubuklinggau	114
✓ 17. Mathematical Improve Communication Skills Students With Learning S1 Pgmi Matakuliah Metodologi Investigation on Research in City Iain Bengkulu	120
18. Influence of Components of Straw Composites and NPK Fertilizers on Growth Chili (<i>Capsicum annuum</i> L.)	128
19. Genetic Diversity of Local Buffalo (<i>Bubalus bubalis</i>) South Sumatra-Based Microsatellite Hel09	132
20. Recommendations of Fertilization For Rice Crop On Upland in South Bengkulu	136
21. The Benefits of Red Dragon Fruit (<i>Hylocereus polyrhizus</i>) Leather Juice and Organoleptic Testing to The Endurance of Wet Noodles	140
22. Study of Sound Beat using Sundanese Flute and <i>Adobe Audition</i> ^{TM1.5}	145
23. An Analysis Of Physical Characteristics of Oil as The Effect of Types and Reuse and the Application of Absorbent in the Process of Oil Purification.....	152
24. Inventory of Wild Plants That Can Be Used As Drugs In The Environment STKIP PGRI Lubuklinggau	159
25. Inventory Famili Zingiberaceae and This Using At Air Satan Village of Muara Beliti	164
26. Conservation Character of Biology Learning for Z Generation	168
27. The Fish Inventory at River in District of South Lubuklinggau II	172
28. Effect of pH of The System on The Titanium(IV) Dioxide Synthesis	179
29. Enantioseparation of Ofloxacin With L-Isoleusin Into Diastereoisomers Using Liquid Preparative Chromatography	183
30. The Use of Video Simulation to Improve Students Understanding of Chemical Bonding Subject.....	187
31. Test Activity Anti Plasmodial Chitosan - <i>Jatropha multifida</i> L. Nanopartikel Through Mice Infected <i>Plasmodium berghei</i>	193
32. Application of Learning Model of Social Inquiry to Improve Student's Activity and Learning Outcome on Nonparametric Statistics at Mathematics Study Program at Unib	197
33. Improvement of student Misconceptions of physics using the E-learning Program.....	204
34. Identification of Bamboo Species Diversity in Rahma Sub-District in South Lubuklinggau I Lubuklinggau City	210
35. Realistic Mathematics Learning Based on Bengkulu Ethnomatematics to Increase Cognitive Level.....	214
36. Study on Quality Management of Learning (Qualitative Descriptive Study at University of Prof. Dr. Hazairin, SH Bengkulu)	226
37. Profile of Pre-Service Teacher's Ability to Design Learning Activity.....	232

38. The Effect of Project Based Learning (PjBL) Model to Improve High-Order Thinking In Biology Learning	237
39. The Making of Organic Chemistry 1 Digital Books by Using The Sigil Epub Editor Application	242
40. Application of Inquiry Models Based on Service Learning to Increase Students of Semester Students V Biology Education in Producing LKPD (Employee Work Sheet) in Lecturer of Selected Kapita 2.....	251
41. Problem Solving Ability of Physics Education Student in Learning Through Online Tutorial	256
42. Application of Learning Cycle (5e) and Two Stay Two Stray Learning to Increase Results Learning Basic Chemicals	261
43. Project Based Learning Model Based on Local Potency in Counter Taksonomi (Zoologi)	266
44. Cracking Catalytic Methyl Esther From Pome Conversion by Sonochemistry.....	271
45. Synthesis of Methyl Ester of Waste CPO With Sonochemistry And Cracking Catalytic With Co-Mo/Hz be Biofuel	276
46. Nutrition Study <i>Colocasia esculenta</i> and <i>Colocasia Gigantea</i> as Fever <i>Monouria Emys</i> in Area of Turtels Conservation University of Bengkulu	281
47. The Isolation and Identification of Triterpenoid Compounds From <i>Jatrophan multifida</i> L. Leather Extracts	288
48. <i>Cyclemys oldhamii</i> 's Monitoring in Taman Pintar <i>Ex situ</i> Conservation Area Bengkulu University.....	296
49. Adaptation Study of <i>Notochelys platynota</i> in <i>Ex-Situ</i> Conservation Pond The University of Bengkulu.....	302
50. Adaptation Study of <i>Siebenrockiella crassicollis</i> in Ex Situ Conservation Pond of University of Bengkulu (UNIB).....	306
51. The Development of Graphite Pencil Electrode For Chromium (VI) Determination Using Adsorptive Stripping Voltammetry	310
52. Solution of Nonlinear Equation Wave Mation With Using Approximation Homotopy.....	314
53. Analysis of Land Use Damage in Danau Dusun Besar Nature Reserve Area Bengkulu City.....	326
54. The Readiness of Guidance and Counseling Teachers in Facing The Asean Economic Community (MEA).....	335
55. Competency Analysis of Facilitator and Competency of Participants in relation to Improving the Value of Curriculum 2013 Training for Mathematics's teacher at Junior High School Year 2017	341
56. Learning Using Search, Solve, Create and Share (SSCS) Problem Solving to Enhance Students' Critical Thinking.....	349
57. Article Scientific Improve Motor Skills and Logic Math Early Childhood Game Play Through Traditional Method "Suda Manda".....	354

17. Mathematical Improve Communication Skills Students With Learning S1 Pgmi Matakuliah Metodologi Investigation on Research in City Iain Bengkulu

Dian Oktari^{1*}, Haji Saleh¹

¹University of Bengkulu

*Email: okta.diandri@yahoo.com

ABSTRACT

The purpose of this study was to determine keterlaksanaan investigative learning to improve the communication skills of mathematics students S1 Prodi PGMI State Islamic Institute (IAIN) of Bengkulu through investigative learning. The research method used is the PTK (Classroom Action Research). Subjects were students S1 Prodi PGMI State Islamic Institute (IAIN) Bengkulu city, amounting to 32 people. The study lasted for two cycles to improve communication skills by learning mathematical investigation. Results of research on improving students' mathematical communication skills are taught through learning an investigation was 53.13% in the low category which is the average score of the outcome overall mathematical communication skills of students orally in the first cycle and test results in writing mathematical communication ability is still low with an average percentage of 37.50 in cycle I. In the second cycle an increase in the overall percentage of students mathematical communication skills orally reached 95.83% which is at high category and an increase in the overall percentage of students in mathematical communication skills tertulis reached 87.50% which is located in the high category.

Keywords: mathematical communication skills, learning investigation

1. Introduction

Education is an aspect which was instrumental in print quality human because human being through education will lead to a better life. In order for optimal educational goals achieved by the lecturers and teachers as educators demanded to develop a learning process to suit the condition and age progresses. More specifically, the lecturers are required to always be creative and innovative in order to prepare the lecture activities of student teachers are qualified and competent in their field.

Math train men to have the ability to reason logically, systematically, creative, critical, rational, careful; the ability to be honest, open, objective, cooperate, creative; act effectively and efficiently. These abilities should be prepared early on to students especially for student teachers of mathematics.

In mathematics, communication skills need to be presented intensively so that students are actively involved in learning. Mengkomunikasikan activities can not be separated from mathematical communication skills that are part of a mathematical power or high-level mathematical thinking. Student teachers need to be given a good mathematical communication skills that will be able to melatih and teaching mathematics well.

Communication skills according to [1] is the ability to convey mathematical ideas, either orally, in writing or deed. The ability is one's ability to be achieved in mathematics.

In order to hone the communication skills necessary mathematics student teachers learning model is designed according to the constructivist view because, according to this view learning is aimed at helping students to build concepts / principles of mathematics on their own through

a process of assimilation and accommodation. One model of learning that could be expected to improve mathematical communication is learning model group investigation.

According to Evans in [2] model of investigative learning is student activities that are spread (divergent activity). In college it is understood that the students be given the opportunity to think, develop, investigate interesting things that disturb their curiosity. Students are faced with a situation that is full of questions that could lead to confrontation and to encourage the creation of intellectual investigation. According to Kissane [3] study with investigation likened, "A person given a fish is fed for a day. A person taught to fish is fed for life". The point with these investigative activities, the students are trained to not just accept something that is so like by a fish that can be eaten and stayed for a day, but they are trained like learn to catch fish so he can eat fish during his lifetime. Meanwhile [4] describe the phases in the learning phase GI ie read, translate, and understand the problem; phase and phase troubleshooting answered and communicate the answers.

Mathematical communication skills is one of five high-level thinking skills. In the article about the five high-order thinking skills described that involves Communication receiving and sharing ideas and can be Expressed in the forms of numbers, symbols, diagrams, graphs, charts, models and simulations. This means that the mathematical communication involves receiving and giving ideas and can be expressed in the form of numbers, symbols, charts, graphs, diagrams, models and simulations. According to [2] mathematical communication skills a student's ability to use mathematics (mathematical language) and the student's ability to communicate mathematics in the study as the content of the message to be conveyed. The message contains the material that students learn math, for example in the form of concepts, formulas, or a problem-solving strategies. Parties involved in the events of communication in the classroom is a lecturer and students. How to transfer the message can be verbal or written. As for the problems in the Innovative Practice of Learning Math is How to improve communication skills of mathematical students S1 PGMI with learning investigation on the subject of research methodology in IAIN city of Bengkulu

Based on the exposure that has been described above, the formulation of this problem is How to improve the communication skills of mathematical students with learning investigation the research methodology course in IAIN city of Bengkulu.

2. Methods

Method in this study is a qualitative method, because it aims to describe the application of contextual learning to improve motivation and class VIII student at SMPN 10 Malang. This type of research is classroom action research (classroom action research) is a research done to improve classroom practice [5]. In this case, the presence of researchers in the field is an absolute and researchers planning, implementation, summed up the data, interpret data and report the results.

The study took place at the Islamic Institute of Bengkulu (IAIN). Subyek of this study is the third semester students with 32 students consisting of 7 male students and 25 female students.

Sources of data in this study is twofold researchers as the executor of learning by using investigative learning model and students were observed in the group at the time of the investigation the learning process. Of each of the students observed the behaviors that lead to the four conditions, namely communication of attention, relevance, confidence and satisfaction. Observations made during the implementation of learning activities. Pengamatannya investigation done by filling the observation sheet of students communication skills so that the data of this research is the result of observation.

This research was conducted through two stages repeated that make up the cycle. The two stages are stages of planning (planning), implementation (acting), monitoring (observing) and Reflection (reflecting). The data analysis in this study is the analysis of data sheets validation of research instruments and learning tools used and data analysis research conducted whenever the

learning cycle berakhir. Indikator keberhasilan pada this study is when there is 70% or more meetings in the cycle of increasing communication skills and included into the category Good. To check the validity of the findings, the triangulation by comparing the data obtained from the results of observations with field notes and workmanship of students either individually or in groups.

3. Results and Discussion

3.1 Results

3.1.1 Cycle 1

Based on every aspect of communication in learning mathematical observed in the first cycle test result data obtained written mathematical communication student teachers as follows:

Table 1. Data communication test mathematical ability of students in writing in Cycle I

No.	Indicator	Percentage
1	Describe the problem situation and stated solution to the problem using pictures, tables, charts algebraically	37.50%
2	stating the results in written form	100.00%
3	using a thorough representation to represent a of the mathematical concepts and solutions	87.50%
4	Make a mathematics situation by providing ideas and information in written form	93, 75% of
5	Using the language and symbols of mathematics appropriately.	87.50%
The average percentage of		81.25%

From Table 1 above it can be seen that mathematical communication aspect that still relatively low criteria is to describe the situation and the problems stated problem solution using images, tables, charts are algebra that is equal to 37.50% and for aspects others already meet high criteria. As for the criteria of ability 37.50% 87.50% 93.75% of students mathematical communication in writing for all aspects of the observed already meet high criteria, reaching 81.25%. While the observation of mathematical verbal communication skills are presented in Table 2 as follows:

Table 2. Data from observation of student mathematical communication skills orally in Cycle I

No.	Indicator	Percentage
1	Presenting a solution of a problem	75.00%
2	Using tables, images, models, and others to deliver answers on an issue	37.50%
3	Selecting the most appropriate way to present the the answers of a problem	37.50% of
4	Providing advice or second opinion for answer of the to a question that is easier	43.75%
5	Responding to a statement or issue of the audience in the form of a convincing argument	56.25%
6	Ability to interpret and mengevaluas ideas, of symbols, terms, and mathematical information.	68.75%
The overall percentage of		53.13%

Based on the data in Table 2 above shows that the sixth indicator has achieve high category while five Other indicators are still in the category medium and low. Overall mathematical communication skills of students orally middle category ie 53.13%, is because there are some indicators that students' mathematical communication skills low percentage. Using such tables, pictures, models, and others to deliver answers to a problem that is 37.50%, Selecting the most appropriate way to present the answer to a problem that is 37,50%, provide advice or other opinion to answer from a an easier question, namely 43.75%, Responding to a statement or issue from the audience in the form of a convincing argument that is 68.75%. These indicators are causing the percentage of verbal communication skills in the low category.

3.1.2 Cycle II

Based on every aspect of student mathematical communication was observed in the learning in the second cycle test result data obtained mathematical communication student teachers as follows:

Table 3. Data communication test results matemtis student teachers.

No.	Indicator	Percentage
1	Describing the problem situation and declaresolution of problems using pictures, tables, charts algebraically	56.25%
2	Stating the results in written form	100.00%
3	Using a thorough representation to express a of the mathematical concepts and solutions	100.00%
4	Make mathematical situation by providing ideas and in the form of a written statement	100.00%
5	Using the language and symbols of mathematics appropriately.	81.25%
	The average percentage of	87.50%

Table 3 above shows that there 4 algebraically chart communication aspects. in overall criteria mathematical communication Students observed in the high category namely 87.50%. While the results of the observation ability mathematical communication orally at the second cycle is presented in Table 4 as follows:

Table 4. Data from observation of student mathematical communication skills orally in Cycle

No	Indicator	Percentage
1	Presenting a solution of a problem	100,00%
2	Using tables, drawings, models, and others to deliver answers of a problem	100,00%
3	Selecting the most appropriate way to present the response of a problem	100,00%
4	Providing advice or other opinion toanswer ofto a question that is easier	100,00%
5	Responding to a statement or issue of an audience in the form of a convincing argument	100,00%
6	Ability to interpret and mengevaluas ideas of symbols, terms, and mathematical information.	75,00%
	The overall percentage of	95,83%

Data from observation of mathematical communication skills orally over shows that six indicators have met the high category even five indicators has achieved the maximum score of 100%. While the overall percentage of students mathematical communication skills orally reached 95.83% which is at the high category, because all indicators mathematical communication skills of students on average have a higher percentage of 100%.

Based on the evaluation results at the meeting of the first cycle shows that the members of the group are many causes less effective in the discussion. So that at the meeting of the second cycle reduced the number of members of the group which resulted in the addition of a discussion group in the class, which was originally only 4 groups into 5 groups. Besides learning in the second cycle also dikolabasikan with gallery work, so the verbal communication skills of students mathematical increases. It is quite effective at increasing the activity of learning in the classroom, resulting in the improvement of student mathematical communication skills both verbally and in writing.

3.1.3 The test results of mathematical communication skills

From the research that has been done following the data obtained. The test results of mathematical communication skills of students based on learning outcomes 1 cycle, cycle II. Summary of average values can be seen as follows:

Table 5. Summary of Percentage of math students komunikai Ability Test in writing.

Categories	Cycle I	Cycle II
Rat - average	81.25	87.50

The results of the test percentage mathematically written communication skills of students in the first cycle was 81.25 classified as high category, only one indicator that scored low percentage. Having done the second cycle there is an increase this percentage becomes 87.50 due to higher percentage of each indicator in mathematical communication skills. So the increase in the percentage of mathematical communication ability test first cycle to the second cycle was 6.25%.

Recapitulation average student mathematical communication ability test in terlulis presented through charts like Figure 1 below.

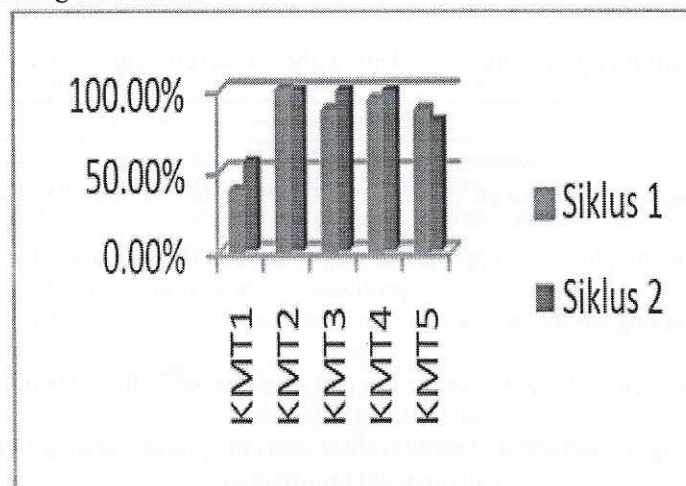


Figure 1. Average test score written communication skills mathematical student.

In Figure 1 shows the increase and decrease in average in the first cycle and the second cycle that occurs every indicator on the ability komunikasi mathematics (KMT). In this study, in addition to using the data communication test mathematical, researchers also used data from observation to observe the student mathematical communication skills orally. Exposure increase student mathematical communication skills recapitulation presented below:

Table 6. Summary of average percentage of student mathematical communication skills orally

Categories	Cycle I	Cycle II
Rat -Average	53.13	95.83

percentage of observation results of mathematical communication skills of students in the first cycle is 53, 13 belong to the category of rendahada some indicators that scored low percentage. Having done the second cycle there is an increase this percentage becomes 95.83 due to higher percentage of each indicator in observation of mathematical communication skills. So the percentage increase oral test mathematical communication skills first cycle to the second cycle was 42.7%.

Recapitulation average student mathematical communication ability test in terlulis presented through charts like Figure 1 below.

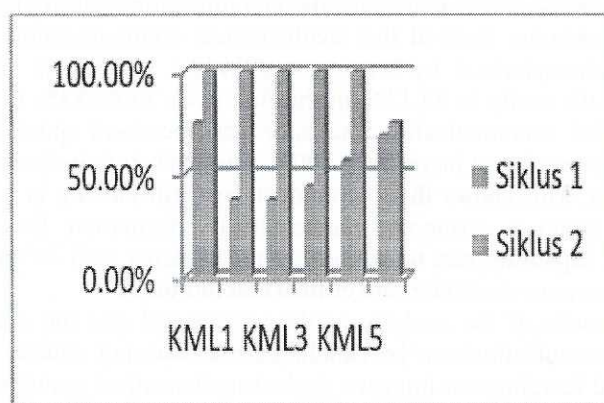


Figure 2. Mean Values Oral test mathematical communication ability of students.

In figure 2 seen average increase ratates oral mathematical communication skills of students in the first cycle and the second cycle that occurs every indicator on the ability komunikasi mathematics (KMT).

3.2 Discussion

The results of a classroom action research consisted of two cycles of the study subjects using the methodology of learning investigation showed an increase in mathematical communication skills student teachers. This is evident from the analysis of the test results of mathematical communication skills student teachers in both cycles. Based on the results of tests the communication skills of mathematical obtained percentage communications capabilities mathematical students in learning research methodology by using learning investigation as follows:

Based on the results of tests the ability of mathematical communication in writing in diagram 1 above, in general there is an increase in the ability of mathematical communication students with applied learning investigation. Aspects describe the problem situation and express solutions to problems using pictures, tables, charts algebraically (KMT1) has increased from

cycle 1 (37.50%) to the second cycle (56.25%). While aspects of the results stated in written form (KMT2) had no change in each cycle, because all the students write the answers in writing on the answer sheet. Aspects used to declare a thorough representation of mathematical concepts and solutions (KMT3) increased by 12.5% from the first cycle. Similarly mathematical aspects of making the situation by providing ideas and information in written form (KMT4) increased from 93.75% in the first cycle to 100% in the second cycle. The test results written communication skills math in the first cycle shows that students have begun to write his work systematically, write an explanation / description on every step pengerjaanya so it seemed on the answer sheet instead of calculating it. While the communication aspect, namely the fifth mathematical language and mathematical symbols correctly (KMT5) decreased. This can be seen in the second cycle there are some students who lack the proper use of mathematical symbols in the execution of a given test.

Categories mathematical communication ability of students in writing in two cycles included in the high category with no increase in the percentage is 81.25% in the first cycle increased to 87.50% at siklus II. Although this increase is not high enough yet to see the condition of students in the class, this is already a good result. Of the five written mathematical communication indicator, the indicator describes the situation of the problem and states solution to the problem using pictures, tables, charts algebraically had the lowest percentage. Although during the second cycle of action, these indicators have increased but the increase is not large enough that only 18.75%.

Based on the observation of mathematical communication skills orally student teachers during learning in the classroom showed that mathematical communication ability of students also increased. It is characterized by an increase in the percentage of student mathematical communication skills orally ie 53.13% in the first cycle to 95.83% in the second cycle. Sixth mathematical verbal communication indicator has increased quite significantly, even the indicator reached a maximum increase of 100%. Only the sixth indicator that does not reach the maximum increase. This shows that the students are still lacking in terms of interpreting and evaluating ideas, symbols, terms and mathematical information. So that needs to be trained again so that this capability can be owned by the students well in order to educate and train students to become more candidates are critical and thorough.

Based on the results of the analysis of the written test and the observation of the student mathematical communication can be concluded that learning courses Research Methodology using investigative learning can improve student mathematical communication skills. It can be seen from the increase in the average score of students mathematic communication capabilities at each cycle the action. Learning courses using the Research Methodology of Investigation learning easier for students to understand the lecture material for students to be actively involved in discussion groups through a series of steps to understand the problem, solve problems and communicate the answers. It is very good to train the communication skills of students as a preparation to be a teacher in the future.

4. Conclusion

4.1 Conclusion

Based on research results by using the class action learning methodology courses Investigations on research conducted on student teachers PGMI study program in the academic year 2016/2017 can be concluded that an increase in student mathematical communication skills both written and verbal. It can be seen from the results of a written test mathematical communication skills of students showed an increase from the first cycle ie 81.25% to 87.5% in the second cycle with high criteria, as well as the observation of the student mathematical communication skills orally which also shows the increase ie 53.13% in the first cycle with category increased to 95.83% in the second cycle with high category.

4.2 Recommendations

In the progress of the times and technological sophistication should educators can utilize various instructional model for teaching and learning in the classroom. One model that can teachers do in the classroom learning is the learning of the investigation. This learning model is able to explore the capabilities of the students, such as mathematical communication skills. This ability to build students as a form of one student in the 21st century skills

References

- ☐ Haji Saleh. 2016. Mathematical Communications Upgrades Through Realistic Mathematics Education. Bengkulu. UNIB Bengkulu. www.Repository.unib.ac.id
- ☐ NCTM. (2000) *Principles and standards for school mathematics*. Reston, VA: Author
- ☐ Sadiq, F. (2000). *Investigation in the Activity Teaching Mathematics*. Journals Gentengkali, Issue 5 Year III, p. 35 – 37
- ☐ Sadiq, Dawn. 2004. "Problem Solving, Reasoning and Communication." Paper presented at Diklas Instructor / Developer High School Mathematics Study Association, on August 6 to 19, Yogyakarta. Accessed on 18 April 2015 at 20:22 pm (<http://p4tkmatematika.org/downloads/sma/pemecahanmasalah.pdf>).
- ☐ Setiawan, (2006). *Mathematics Instructional Model Approach Investigation*. Yogyakarta: P3G Math.
- ☐ Arikunto, S. (2013). *Procedure Research: A Practical Approach*. Jakarta: Rineka Reserved.

Bengkulu International Conference on Science and Education (BICSE - 2017)



Supported by:



USAID
FROM THE AMERICAN PEOPLE



UNCG
College of Visual
and Performing Arts

ISBN 978-602-8043-84-7

9 786028 043847