

ISBN 978-602-6697-36-3

PROCEEDING

Science, Technology, Engineering and Mathematics
Education International Forum 2019

Keynote Speaker:

Prof. Dr. phil. Ari Widodo, M.Ed.
Universitas Pendidikan Indonesia, Bandung

Dr. Roslinnawati binti Mohd. Roslan
Universiti Brunei Darussalam

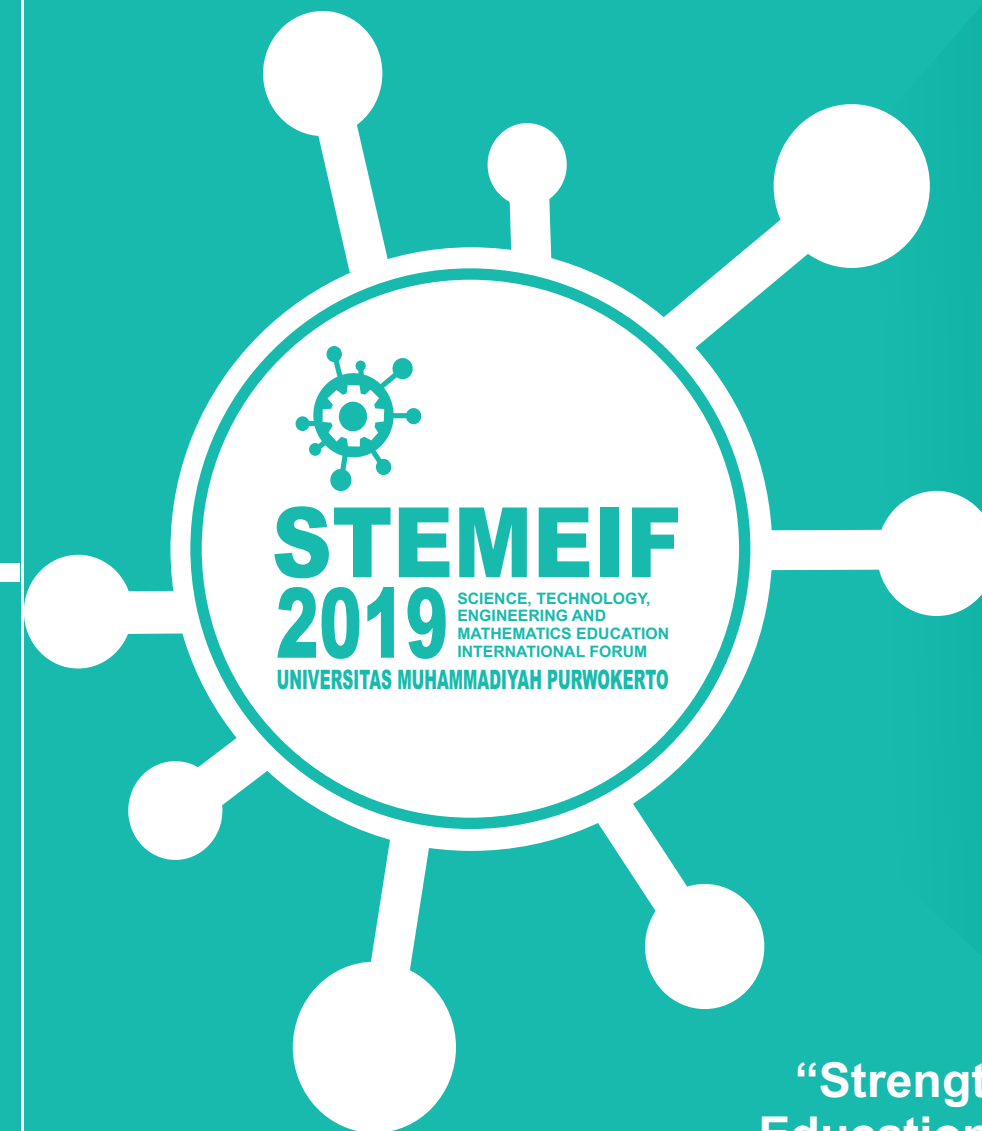
Dr. Qorrienna Abdul Talib
Universiti Teknologi Malaysia

Dr. Widya Karmila, M.Pd.
Himpunan Dosen PGSD Indonesia

Dr. Subuh Anggoro, M.Pi., M.Pd.
Universitas Muhammadiyah Purwokerto

Editor:

Agung Nugroho, M.Pd.
Drajat Hasan, M.A.



**“Strengthening the STEM
Education and Digital Skills”**

Organized by Elementary Teacher Education Study Program, Universitas Muhammadiyah Purwokerto
in Collaboration with
Universiti Teknologi Malaysia and Himpunan Dosen Pendidikan Guru Sekolah Dasar Indonesia (HDPGSDI)

Purwokerto, 25th April 2019

PROCEEDING

Science, Technology, Engineering and Mathematics
Education International Forum 2019

“Strengthening the STEM
Education and Digital Skills”

ISBN 978-602-6697-36-3



Science, Technology, Engineering and Mathematics
Education International Forum 2019

Organized by Elementary Teacher Education Study Program, Universitas Muhammadiyah Purwokerto
in Collaboration with
Universiti Teknologi Malaysia and Himpunan Dosen Pendidikan Guru Sekolah Dasar Indonesia (HDPGSDI)
Purwokerto, 25th April 2019

<http://conferences.pgsd.ump.ac.id>

Diterbitkan Oleh:



UM Purwokerto Press (Anggota APPTI)
Email : ump.press@gmail.com
Website : www.lpip.ump.ac.id



PROCEEDING

1st International Seminar

STEMEIF

**(Science, Technology, Engineering and Mathematics
Learning International Forum)**

“Strengthening the STEM Education and Digital Skills”

Purwokerto, April 25th 2019

Hall A.k Anshori, Universitas Muhammadiyah Purwokerto



UM Purwokerto Press

**1st Science, Technology, Engineering and Mathematics Learning International Forum (STEMEIF)
2019 Proceeding**

Purwokerto, April 25th 2019
Hall A.k Anshori, Universitas Muhammadiyah Purwokerto

first print : August 2019
xi+670 hlm, 21 cm x 29,7 cm
ISBN: 978-602-6697-36-3

- Steering Committee : Drs. Pudiyono, M.Hum.
(Dean of Faculty of Teacher Training and Education, Universitas Muhammadiyah Purwokerto)
- Organizing Committee : Arifin Muslim, M. Pd.
- Reviewers : Prof. Dr.phil. Ari Widodo, M.Ed. (Universitas Pendidikan Indonesia)
Dr. Roslinawati Mohd. Roslan (University Brunei Darussalam)
Dr. Corrienna Abdul Talib (University Teknologi Malaysia)
Dr. Ade Gafar Abdullah, M.Si. (Universitas Pendidikan Indonesia)
Syeilendra Pramudya, Ph.D. (Institut Teknologi Bandung)
Dr.Eng Asep Bayu Dani Nandiyanto (Universitas Pendidikan Indonesia)
Dr. Isma Widiaty, M.Pd. (Universitas Pendidikan Indonesia)
Santhy Hawanty, Ph.D. (Universitas Muhammadiyah Purwokerto)
Asih Ernawati, Ph.D. (Universitas Muhammadiyah Purwokerto)
Dr. Subuh Anggoro (Universitas Muhammadiyah Purwokerto)
Dr. Sriyanto (Universitas Muhammadiyah Purwokerto)
Haryanto, Ph.D. (Universitas Muhammadiyah Purwokerto)
- Editor : Agung Nugroho, M.Pd.
Drajat Hasan M.A.
- Secretary : Agung Nugroho, M.Pd.
Badarudin M.Pd.
- Treasurer : Sri Muryaningsih, M. Pd.
Lia Mareza, M. A.
- Event Division : Drs. Sri Harmianto, M. Pd.
Cicik Wiarsih, M. Pd.
Pratik Hari Yuwono, M. A.
Dhi Bramasta, M. Pd.
- Documentation Division : Dedy Irawan, M. Pd.
Yudha Febrianta, M. Or.
Karma Iswasta Eka, M. Si.
- Consumption Division : Okto Wijayanti, S. Pd., M. A.
- Equipment Division : Tri Yuliansyah Bintaro, M. Pd.

Penerbit

UM Purwokerto Press (Anggota APPTI)

Jalan Raya Dukuh Waluh, PO.BOX 202, Purwokerto 53182, Telp (0281) 636751 ext:474

Email : ump.press@gmail.com

Website : www.lpip.ump.ac.id

FOREWORD

Assalamualaikum warahmatullahi wabarakatuh.

All the worship and praise of Allah almighty for all his grace and blessings so that the **Science, Technology, Engineering and Mathematics Learning International Forum (STEMEIF) 2019** with the theme **“Strengthening the STEM Education and Digital Skills”** can be held. This International Seminar is a manifestation of the role of Education Faculty of Universitas Muhammadiyah Purwokerto in developing the quality of education, particularly the application of educational sciences in the empowerment of individuals and society, in accordance with the intended vision. Through this international seminar it is also expected to become a medium for sharing ideas related to education in particular and empowering individuals and society in general. Sharing these ideas is expected to be a link in increasing the empowerment of individuals and communities towards a better society.

Our thanks to the Rector Universitas Muhammadiyah Purwokerto for all support in the implementation of this international seminar. Our greatest thanks to all International Seminar organizers who have worked hard for the realization of this seminar. To all stakeholders we thank you for the positive contribution. To all the participants of this seminar we thank you for the participation, accompanied by apology if there is a shortage in the implementation

May Allah SWT bestow all His blessing on all our toil. Amin.

Wassalamualaikum warahmatullahi wabarakatuh.

Purwokerto, April 25th 2019
Dean,

Drs. Pudiyo, M.Hum.

TABLE OF CONTENT

TITLE PAGE	i
FOREWORD	iii
TABLE OF CONTENT	iv

KEYNOTE SPEAKER

Dr. Corrienna Abdul Talib (University Teknologi Malaysia)	1
Prof. Dr. Phil. Ari Widodo (Universitas Pendidikan Indonesia)	10
Dr. Widya Karmila, M.Pd. (HDPGSD).....	18
Dr. Subuh Anggoro, M.Pi., M.Pd. (Universitas Muhammadiyah Purwokerto)	26

PARALEL SESSION

1. Science Teachers' Perception About Laboratory Activity on Mixture Separation Topics	36
R Meidayanti, N Fadiawati, and C Diawati	
2. Understanding Disaster Mitigation Volcanic Eruption Residents Primary School Mountain Slamet Banyumas	44
Agung Nugroho, Dedy Irawan	
3. The Application of Blended Learning's Station Rotation Method in Elementary School's Science Education to Improve Higher Order Thinking Skills	51
S Christina, Rusijono, and B Bachtiar	
4. Implementation of Counseling Guidance for Children with Special Needs (Viewed from Psychological Aspects, Socio-Culture and Science and Technology Development).....	60
Lia Mareza	
5. Flashcard for Enriching and Developing the Child Vocabulary with Speech Delay to Improve Lingual Skill.....	70
C Dahniarti, M Siti, and A Fajar	
6. Students' difficulties analysis in solving systems of linear equations in two variables.....	77
Novianti and B A Priatna	
7. The Effectiveness Of The Guided Inquiry Learning (Gil) Model On Science Learning Outcomes On Additive And Addictive Topics In SMP Negeri 4 Pulau – Pulau Terselatan.....	83
Sendry Richard Dahoklory	
8. Implementation Of Model Discovery On Learning Outcomes Of Natural Science In Grade 8 Students Junior High School Fortunately Suropati Sidoarjo.....	90
Yosef Frina Demezt	

9. The Effectiveness of STEM Integrated Handouts to Improve Students Creative Thinking Skills in Biotechnology Material.....	98
W Mentari, Abdurrahman, dan T Jalmo	
10. The Application Of The CTL Model For Junior High School Students in Social Studies in Grade VII Students.....	103
Famie Darmawan, Rusijono, Bachtiar	
11. Self-Criticism Scale.....	107
T. Tarmizi, A. Navissa, F. Dian, F. Rahma, A. Retno	
12. Perception of Teachers and Students by Using Interactive Multimedia to Improve Science Literacy and Self-Efficacy.....	113
THWibowo, Sunyono, dan RB Rudibyani	
13. Development Of The Three Tier Diagnostic Test Based 'Higher Order Thinking Skills' Instrument	118
Ni Wayan Novita Sari, Sunyono, and Abdurrahman	
14. Development of Students' Worksheet Problem Based Learning of Environmental Pollution to Improve Critical Thinking and Discipline.....	127
M. Uyang, Tri Jalmo, M. Setyarini	
15. The Evaluation Implementation Of Education Unit Level Curriculum In MI Bahrul Ulum Palemwatu Menganti Gresik	135
Gilang Ilham.F	
16. The Effect Of Adolescent Sinetrons On The Character Of Elementary School Students	141
Para Mitta Purbosari	
17. The Innovation of Science Learning through Mind Mapping Techniques of PGSD Students in Second Semester at Univet Bantara	147
Dwi Anggraeni Siwi, Nurratri Kurnia Sari	
18. The Use of Pop Up Book in Theme of Nature and Surrounding by Contextual Teaching and Learning (CTL) Learning Model for Students of PAUD Aisyiyah of Aisyiyah Rawalo Branch	154
Tatik Ariyati, Sri Muryaningsih	
19. "The Application of Singing Through Listening Section to Improve Language Skill"	163
Saepulloh	
20. Improving Critical Thinking Ability And Self-Confidence Attitude Of Students In Angle Measurement Material By Using Arias Learning Model In Fourth Class At SDN 2 Karangsentul.....	167
R Utami, S Muryaningsih, and L Mareza	
21. Improving Discipline and Mathematical Learning Achievements On The Topic Of Rounding The Result Of Length Measurement Through Contextual Approach For Fourth Grade Of SDN 2 Karanggintung.....	177
Syafrudin Hafiz Guntoro, Pamujo, Sri Muryaningsih	

22. An Effort To Improve Curiosity And Mathematics Learning Achievement On Angle Measurement Through Think Pair Square Cooperative Learning Model On The Fourth Grade Of SD Negeri 2 Kebakalan 185
Tommy Ridho Nugroho, Sri Muryaningsih, Aji Heru Muslim
23. Improving Democratic Attitude And Mathematics Learning Achievement of Measuring Angle Material Using STAD Cooperative Learning Method Supported by Angle-clock Props on Grade IV B Students of SD Muhammadiyah Purwokerto 193
Aditiyas Pangestu, Sri Muryaningsih, Tri Yuliansyah Bintaro
24. The Development of Study Achievement 4th Grade Students Using Problem Based Learning Model on 9th Theme Kayanya Negeriku in SD N 2 Sokaraja Kulon 200
Ihda Kurotul Aini, Dhi Bramasta, Badarudin
25. The Effectiveness Of Media Flash Card On Mathematics Learning Achievements On Topic Of Multiplication At The Fifth Graders Of SD Negeri 1 Sukoharjo 205
Rischarinda Grafinasari, Sri Muryaningsih, Okto Wijayanti
26. STEM Education in Integrative Thematic Learning to Improve Students' Creative Thinking Abilities in Elementary School..... 212
Amiruddin B, Arna Juwairiyah, and Subhan
27. Developing Rhythmic Activity Of Barongan Modification For Physical Education Learning At Elementary School..... 220
Yudha Febrianta, Pamuji Sukoco, Fx Sugiyanto
28. How to develop colligative properties of solution chemistry e- book based science process skills approach with 4S TMD models ? 227
W S Wahyuni, S Anwar, G Priscylio, O Lestari, N R Agustina, and C Oktasari
29. Using Conceptual Change Texts to Address Teachers' Misconception at Verbal dan Visual Representation on Heat Conduction Concept 238
R S Anam, A Widodo, and W Sopandi
30. How to improve the mathematics problem solving ability of the college primary teacher education..... 245
A Setiawan, Soeharto
31. Crossword puzzle-based utilization of ICT as an innovation in learning in primary schools..... 252
Rohmah Suciningrum, St. Y. Slamet, and Hartono
32. Mathematical Problem Solving based on Prior Mathematics Ability 256
I Muhafidin, E Nurlaelah, and A Hasanah
33. Analysis of Student's Errors in Solving Mathematical Communication Problems 264
A Aini, B A Priatna, N Priatna
34. Analysis Of Mathematics Problem Solving Ability Viewed From Students' Cognitive Style 271
N Nur, K Yulianti

35. Analysis Of Students' Error In Solving Word Problem of One Variable Linear Equation	277
Rauzah, Kusnandi and A Jupri	
36. The Analysis of Mathematical Comuunication Ability for Students in Quadrilateral at 8 th grade on Islamic Junior High School.....	285
N. Barizah, Al Jupri	
37. Analysis Of Students Problem Solving Skill In The Material System Of Two Variable Linear Equations.....	290
Gustrina and Kusnandi	
38. The Relation Between Mathematical Connection Ability And Mathematical Reasoning Ability Of Senior High School Student.....	296
Hanifah Latifah Hadiat and Karyati	
39. Mathematical Literacy Ability of Students for The Content of Space and Shape	301
R Fauzana, JA Dahlan, dan A Jupri	
40. Analysis Of Students' Adaptive Reasoning In Solving Quadrilateral Problem Viewed By Van Hiele's Thinking Level.....	307
A Mulyayunita and Nurjanah	
41. An Investigation of Scientific Argumentation Skills by using Analogical Mapping-based on Inquiry Learning between Experiment and Control Group	312
D Diniya	
42. Number Sense Strategies in Solving Decimal Number Problems	318
WR Heldi, Nurjanah	
43. The Mathematical Problem-Solving Ability of Junior High School Students Based on Their Mathematical Resilience	324
D Attami, Budiyo, and D Indrati	
44. Concept Image of Junior High School Students About Algebra on System of Linear Equations In Two Variables	331
Fajriah, D Suryadi, and S Fatimah	
45. The Contribution Of Biological Practicum Learning Model Based On Creative Research Projects In Forming Scientific Creativity Of High School Students.....	339
A Sukarso, A Widodo, D Rochintaniawati, and W Purwianingsih	
46. The Implementation of Metacognitif Approach in Investigating Students' Reasoning Skills.....	347
Husnul Chatimah, Dadi Rusdiana, Hernani	
47. Mathematical Visualization Process of Junior High School Students Based on Visual and Auditory Learning Style	352
R Keumalasari, A Jupri, and D Suryadi	

48. Analysis of Students Mathematical Understanding Viewed from Visual and Visual-Auditory Learning Styles	360
Mustika Annisa, Hasanah Aan, Herman Tatang	
49. Analysis of Students' Creative Thinking Skill Level in Solving Triangle Problems.....	368
Z Fauzi, YS Kusumah and A Hasanah	
50. Analysis of Students' Mathematical Critical Thinking Ability in Middle School.....	377
S Q A'yun and S Fatimah	
51. The Profile of High School Students' Algebraic Reasoning Abilities: From The Perspective of Gender Difference	384
W Ayuningtyas, Mardiyana and I Pramudya	
52. Science Teacher Perceptions after Implementing Science Technology Engineering Mathematics (STEM) Education Integrated in Indonesian Curriculum	393
M M Winangun and D Kurniawan	
53. The Profile Of High School Student's Mental Model On Chemical Bonding Concept ...	398
Jamiludin Hidayat, Harry Firman, Yayan Sunarya, and Sri Redjeki	
54. Students Understanding Based on APOS Theory in Solving Non-routin Questions on Materials Number Pattern	406
Anna Rachmadyana Harry and Endang Cahya M.A	
55. The Difficulties of Eighth Grader Junior High School Students in Mathematical Literacy	411
T F Ramadhani dan T Herman	
56. Gender and Mathematical Communication Ability of Secondary School Students.....	417
NH Firdiani, T Herman	
57. Mathematical Creative Thinking Process of Junior High School Students Viewed by Cognitive Style.....	423
F Sari, S Prabawanto, and Suhendra	
58. Student's Mathematical Argumentation in Solving Closed Problem	430
D F Noviyanti, D Suryadi	
59. Analysis of Senior High School Students' Problem Solving Skills Profile in Surakarta ...	437
MAK Rindah, S Dwiastuti, Y Rinanto	
60. Identification of Learning Obstacle in Trigonometry Materials in Senior High School..	443
W Erlisa, S Prabawanto	
61. Analysis The Ability of Class IX Students in Solving The Mathematics Word Problem Reviewed From Long-Term Memory	451
R Desriana, A Hasanah, and A Jupri	
62. The Students' Mathematical Argumentation in Circle.....	457
L Daliah, Darhim	

63. Analysis of Problem-Solving Aspect in Biology Electronic Textbooks for 12 th Grade in Indonesia.....	463
R Purwati, Suranto, Sajidan, and N M Prasetyanti	
64. The Efectiveness Learning Media Based On Interactive Multimedia Towards Geometry Transformation Material (Experiment Study of VII grades MTs Nurul Huda Munjul Cirebon).....	471
A.D Agus	
65. The Profil of Student Critical Thinking on Science Learning.....	479
Nuriyanti, T R Ramalis	
66. Problem Solving Analysis in Early Adult Period.....	483
PN Nasution, T Herman, and A Jupri	
67. Analysis of the Ability to Evaluate Students in Environmental Materials Class X High School in Surakarta.....	492
ND Yanti, Maridi, and Sutarno	
68. Analysis of the difficulties of student's problem solving skill in Pythagorean theorems.....	499
R Arafahanisa, Suhendra and Nurjanah	
69. Application of Model Eliciting Activities (MEAs) for Improving The Critical Thinking and Mathematical Representation Skill.....	503
Dewita Riskia, Kartika Yulianti	
70. Video-Based Learning: Using Technology to Increase Student Mathematics Learning Results.....	504
Rahmadani, Iswan Achlan Setiawan, and Elah Nurlaelah	
71. Redesign and Implementation of the OIDDE Learning Model by Integrating Web-Based Formative Assessment.....	513
S Julaeha, T Hidayat, and N Rustaman	
72. Analysis of Students' Thinking Process in Mathematical Problem Solving Viewed From Adversity Quotient.....	518
D K Maharani, D Dasari, and S Prabawanto	
73. Improvement of Mathematical Communication Ability Through Think-Talk-Write Learning Model in Straight Line Equation Materials.....	525
L Izzati, N Priatna and E Nurlaelah	
74. The effect of Match Mine cooperative learning on VIII grade students' mathematics learning outcomes.....	531
L Rahmi, Helma, and D Usdiyana	
75. Analysis of Student's Misconceptions and Mistakes in Learning Fraction.....	535
R R Pulungan and Suhendra	

76. Implementation of Project Based Learning to Improve Students' Mastery of Concepts on Electrolytic Cells Material.....	542
M Lektriani, W Wahyu, and W Sopandi	
77. Development of The Earthquake STEM Teaching Materials.....	548
D N Hidayah, I Kaniawati, and S Anwar	
78. The Comparison Between Student Math Learning Outcomes For Numbered Heads Together (NHT) Cooperative Learning Model and Think Pair Square (TPSq) In Seventh Grade Class Of Iqro IT Junior High School in Bengkulu.....	556
D Ilfiya and Suhendra	
79. The Improvement Students' Critical Thinking Ability Through Differentiated Instruction (DI) approach in terms of Learning Independence.....	561
Maulidiya, E Nurlaelah and Suhendra	
80. Analysis of Mathematical Connections Ability Based on Cognitive Style.....	562
M N Arifin, D Usdiyana, and S Prabawanto	
81. The Development of Mathematical Module Based on OIIDE Learning Model with Comics Illustrations to Improve HOTS Students in Linear Equations.....	568
N P Anggraini, Budiyo, and H Pratiwi	
82. Mathematics Creative Thinking Levels Based on (Learners')? Habits of Mind.....	576
Nosep Sumiarto, Endang Cahya M A	
83. Mathematical Communication Ability Based on Mathematical Resilience.....	582
Ganjar Rahmat Gumelar, Yaya S Kusumah	
84. Improving Basic School Students' Capabilities in Doing Distribution Operations Through Combination of Media Construction and Group Investigation (GI).....	589
Sri Rahayu, Cicilia Ika Rahayunita, Iskandar Ladamay	
85. Helping Students to Use the Product Rule Concept to Solve Counting Principle Problems.....	597
P Astuti, D Suryadi, A Jupri	
86. Comparison of Students' Mathematical Creative Thinking Ability through Means-Ends Analysis and Discovery Learning Model.....	603
G F Ayuningtyas, Y S Kusumah, and A Hasanah	
87. Student's Learning Obstacles in Solving of Geometry Problems.....	611
D G Mawarni, J A Dahlan	
88. Digital Literacy Profile of Biologi Pre-Service Teachers.....	616
I Yuyu Nurul Hizqiyah, A Widodo, S Sriyati, and W Setiawan	
89. Analysis Competency in Solving Word Problems on Quadrilateral Materials Based on Polya Steps on Students' of Class VIII Mts Negeri 2 Kota Bandung.....	623
L Novitasari, Kusnandi	

90. Analyze the Mathematical Communication Ability of Junior High School in Rectangular Materials 628
Myti Sandri, Dian Usdiyana, Nanang Priatna
91. Identification of Problem Solving Skills of Middle School Students in Science Learning..... 634
Y Riznani, P Siahaan
92. Portfolio Learning Model In Efforts To Construct The Student Leadership Values 639
Ine Kusuma Aryani
93. Science Teacher Perceptions after Implementing Science Technology Engineering Mathematics (STEM) Education Integrated in Indonesian Curriculum 650
M M Winangun and D Kurniawan
94. Training on the Use of Bamboo Rib Learning Media to Instill Students' Understanding on Mathematical Concepts on Topic of Geometry Properties in SD Muhammadiyah Purwokerto 655
Karma Isvasta Eka, Sri Muryaningsih, Sony Irianto, Tri Yuliansyah Bintaro
95. The Encouragement of 21st Century Skills through the Integration of STEM Activities in Basic Education 662
C. A. Talib, F. Aliyu