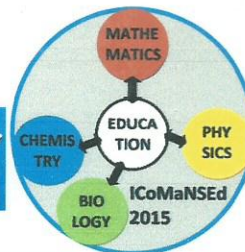




fmipa unima



**Annual Meeting of Mathematics and Natural Sciences Forum of
Indonesian Institutes of Teacher Training and Education
Personnel (MatricesFor IITTEP)**

In Conjunction With:

**International Conference on Mathematics, Natural Sciences,
and Education (ICoMaNSEd 2015)**

August 07-08, 2015, Aryaduta Hotel Manado, Indonesia

Book of Abstracts & Program



Theme:

**"Enhancement and Acceleration on Research and Learning in Mathematics and
Natural Sciences for the Utilization of Natural Resources"**

Supported and Coordinated by:



UM



UNDIKSHA



UNESA



UNG



UNIMA



UNJED



UNP



UNM



UNNES



UNP



UNY



UPI

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WELCOME MESSAGE FROM EVENTS CHAIR



Best wishes to us

May God bless upon us

Assalamu'alaikum wa Rahmatullahi wa Barakatuh

Your excellency The President of Manado State University (UNIMA) Prof. Dr. Ph. E. A. Tuerah, M.Si., DEA., ladies and gentlemen, good morning and welcome to Manado, North Sulawesi, especially to Manado State University.

This seminar entitled the International Conference on Mathematics, Natural Sciences, and its Education (ICoMaNSEd): **Enhancement and Acceleration on Research and Learning in Mathematics and Natural Science for the Utilization of Natural Resources** is organized by Faculty of Mathematics and Natural Sciences, Manado State University, supported and coordinated by 12 members of Association of the Faculty of Mathematics and Natural Sciences from Teacher Program (LPTK).

Ladies and gentlemen, on behalf of the committee of this conference, I would like to thanks and give the highest appreciation to keynote speakers including:

1. Prof. David F. Treagust, Ph.D., FSB., FAERA (Curtin University, Perth, Australia)
2. Rebecca Johnson, MA (Columbia University, USA)
3. Ed van den Berg, Ph.D (Free University, Amsterdam, The Netherlands)
4. Assoc. Prof. Dr. Vichit Rangpan (Yala Rajabhat University, Thailand)
5. Prof. Dr. Syamsu Qamar Badu, M.Pd (State University of Gorontalo, Indonesia)

I would like also to give thanks and gratitude to the invited speakers from 12 universities including:

1. Assoc. Prof. Dr. Kamisah Osman (The National University of Malaysia)

2. Dr. Ir. Sri N
3. Prof. Ferd
- Salatiga, In
4. Prof. Dr
- Indonesia)
5. Prof. Dr. Jul
6. Prof. Drs.
- Indonesia)
7. Prof. Dr. I
- Indonesia)
8. Dr. Slamet S
9. Dr. Suharto
10. Prof. Dr. Sub
11. Dr. Hj. Yuni
12. Suwardi Ana

Now, I would like to
this seminar.

Ladies and gentlemen
required not only the
process, but is also
event to be a dissemin
Finally, I am delighte
been working very ha

Please enjoy the conf

Dr. Rymond J. Ruman

2. Dr. Ir. Sri Nurdianti, M.Sc (Bogor Agricultural University, Indonesia)
3. Prof. Ferdy S. Rondonuwu, Ph.D (Satya Wacana Christian University, Salatiga, Indonesia)
4. Prof. Dr. Zulkardi, M.I.Komp, M.Sc (Sriwijaya University, Palembang, Indonesia)
5. Prof. Dr. Julius H. Lolombulan, MS (Manado State University, Indonesia)
6. Prof. Drs. Manihar Situmorang, M.Sc., Ph.D (Medan State University, Indonesia)
7. Prof. Dr. Liliarsari, M.Pd (Indonesian Education University, Bandung, Indonesia)
8. Dr. Slamet Suyanto (Yogyakarta State University, Indonesia)
9. Dr. Suharto Linuwih, M.Si (Semarang State University, Indonesia)
10. Prof. Dr. Subandi, M.Si (Malang State University, Indonesia)
11. Dr. Hj. Yuni Sri Rahayu, M.Si (Surabaya State University, Indonesia)
12. Suwardi Anas, M.Sc., Ph.D (Makasar State University)

Now, I would like to special thanks to 156 speakers and all of participant required in this seminar.

Ladies and gentlemen, to be able to display text in the real international standard, required not only the international community of scientists involved in the research process, but is also involved in the process of publication. Therefore, I expect this event to be a dissemination of the lecturer researches.

Finally, I am delighted to thank to all the members of the committee who have been working very hard for the success of this conference.

Please enjoy the conference and enjoy in Manado city. Thank you very much.

Dr. Rymond J. Rumampuk, M.Si

WELCOME MESSAGE FROM DEAN



Best wishes for all of us
Assalamu'alaikum wa Rahmatullahi wa Barakatuh

Distinguished Rector of the State University of Manado with the vices rector of Unima, Deans of the Faculties and Chairs of the Institutions;
Distinguished Rector of the State University of Gorontalo and chairmans present today;
Distinguished Chairman of the Forum of Mathematics and Natural Science of Indonesian Institution of Teacher Training and Education Personels (IITTEP)
Distinguished Deans of Mathematics and Natural Sciences Forum members of IITTEP along with vice deans and heads of Departments and Study Programs, and delegates from Faculty of Mathematics and Natural Science of IITTEP;
Especially, distinguished Keynote Speakers, invited Speakers, all the speakers in ICoMaNSEd 2015, and Participants joining this Scientific Conference,

Praise and thanks to the presence of the Lord, because ICoMaNSEd 2015 event can be held today. We are proud because as a part of the academic community, we can take part in enriching the scientific communication forum between scholars through ICoMaNSEd. Through this Scientific Conference, we are present here, to share and to exchange experiences through various experts in the field of Mathematics and Natural Science Education from several countries and various parts of Indonesia. For the implementation of ICoMaNSEd 2015, we thanked to Rector of State University of Manado, Chairman of the Forum of Science IITTEP, deans of Mathematics and Natural Sciences Faculty of IITTEP along with vice deans and heads of departments and study programs, Lecturers and students who support this event so it could be held. In particular, we express our gratituted to Keynotes Speakers and Invited Speakers who have agreed to attend and to present their articles in ICoMaNSEd 2015.

Implementation of Scientific Conference or other sciehtific meetings forms such as symposium, seminar or FGD, etc by a university or research institute, is a form of scientists activities that always continue to strengthen scientific attitude

and the scientists developments, esp forum 2015, thes development in th involved not only Mathematics and M implementation of be the pillars and a Indonesia, especial Manado, North S hospitality and bear

Distinguished partic Last but not least, o Medicine Physiolog de Janeiro Brazil. following question: scientist?". It is an a not need to be too be possessed. On t qualities from ancie less ignored by the s determination; abil difficulties ".

Hopefully the advic inspiration to all the our scientific career man, but to believe.

Shaloom,
Wasalamu alaikum w
Thank you.

Manado, August 3, 2
Dean of the Faculty U
Prof.Dr.Cosmas Polu

and the scientists identity to be opened, objectived, and criticals to the science developments, especially for the further of science development. In ICoMaNSEd forum 2015, these things are reflected in the context of improvement and development in the learning of Natural Sciences and Mathematics. The experts involved not only from IITTEP-universities, but also involve the faculty of Mathematics and Natural Sciences of non- IITTEP ones. We strongly hope that the implementation of present Scientific Conference in State University of Manado, will be the pillars and a reference for the implementation of other scientific events in Indonesia, especially Manado, North Sulawesi. We welcome all the audiences to Manado, North Sulawesi, land of Nyiur Melambai, which is famous for its hospitality and beautiful landscapes.

Distinguished participants and honorable guests,

Last but not least, on this occasion, I would like to quoted from a Nobel laureate in Medicine Physiology back in 1960, Sir Peter Medawar, a British scientist, born in Rio de Janeiro Brazil. His advice for us academics and scientists started from the following question: "Do we need a sharp mind to be able to succeed as a scientist?". It is an anxiety that does not need to be considered, because one does not need to be too clever in order to be a successful scientist. Well-thoughts must be possessed. On the other hand, it would be very helpful to have some good qualities from ancient times that somehow now have been regarded as a trait that less ignored by the scientists. Those properties are: a practical view; perseverance; determination; ability to concentrate; tenacity to not despair when facing difficulties".

Hopefully the advice from the Nobel laureate Sir Peter Medawar, could be an inspiration to all the academics who gathered today towards successful stages in our scientific careers. Keep this adage: "God does not call us to be a successful man, but to believe. Believe, in order to succes".

Shaloom,

Wasalamu alaikum warahmatulahi wabarakatuh.

Thank you.

Manado, August 3, 2015,

Dean of the Faculty Unima,

Prof.Dr.Cosmas Poluakan, M.Si

WELCOME MESSAGE FROM RECTOR



Honourable Vice Rectors and Deans of all faculties,

Honourable keynote speakers from outstanding
universities,

Distinguished all invited speakers and all other speakers,

Distinguished guests,

All participants,

Ladies and gentlemen,

Syaloom,
Assalamu'alaikum warrahmatullah wabarakatuh.
May peace and God's blessings be upon you all.

I am delighted to be here with you today, as you start the Annual Meeting of Mathematics and Natural Sciences Forum of Indonesian Institute for Teacher Training and Education Personnel (Matrices for IITTEP), conducted and sponsored by 12 universities former known as IKIP, in conjunction with International Conference on Mathematics, Natural Sciences and Education (ICoMaNSEd). It is my privilege and pleasure to welcome you all to the Forum and Conference organized by the Faculty of Mathematics and Natural Sciences, State University of Manado in North Sulawesi, Indonesia in which researchers and practitioners on mathematics and science and the education, to get together, share ideas, experiences, expectations, and research findings. I want to extend a warm welcome to all of you, on behalf of the State University of Manado. It is a great honour to host so many distinguished keynote speakers from the USA, Australia, Netherland, and Thailand, distinguished invited speakers from 12 Indonesian Universities namely: UNJ, UPI, UNY, UNNES, UNESA, UM, UNP, UNIMED, UNDIKSHA, UNM, UNG, and UNIMA, and also Malaysia and all participants.

Distinguished guest, Ladies and gentlemen,

The theme of the Learning in Mathematics Resources".

This event is aimed at results, theoretical Sciences, and Education communication between activities by the research and collaborations.

By promoting collaboration opportunity to discuss advancement of science

The development of the scientific character hope, IITTEP always class academic atmosphere research, and communication

Research is one of the to solve the problem formulating the general organized knowledge activities valuable theory and practice conference will be collaborations for institutions, and communication

Distinguished guest, In this very precious gratitude to the key and Indonesia.

I also would like to for their full support 2015. I also wish to Mathematics and Science Committee who do hard work to make shortcomings and in

The theme of the conference is "Enhancement and Acceleration on Research and Learning in Mathematics and Natural Sciences for the Utilization of Natural Resources".

This event is aimed to providing dissemination and publication media for research results, theoretical studies, and best practices in the field of Mathematics, Natural Sciences, and Education; more over, strengthening the interaction and communication between researchers , promote mathematics and science research activities by the researchers in Indonesia and overseas, in hope to build networks and collaborations.

By promoting collaboration across disciplines, we can further extend the opportunity to discover innovations, gain better understanding and enhance the advancement of science body.

The development of Mathematics and Natural Science can not be separated from the scientific characteristics that encourage high-curiosity in doing research. We hope, IITTEP always creating, maintaining, facilitating, and developing the world class academic atmosphere that encourage students and faculty to continue doing research, and community services

Research is one of the Tri Dharma of the higher education . It is a systematic effort to solve the problems or answer the questions through data collecting , formulating the generalities based on the data, then finding and developing organized knowledge by scientific method. It is expected that from research activities valuable empirical facts can be obtained to improve and develop the theory and practice to bring a better quality of education. We do hope this conference will bear fruitful results and promote networking and future collaborations for all participants from diverse background of expertise, institutions, and countries to promote science, mathematics, and the education.

Distinguished guest, Ladies and gentlemen,

In this very precious moment, I would like to express my highest appreciation and gratitude to the keynote speakers from Australia, the USA, Netherland, Thailand and Indonesia.

I also would like to take this opportunity to express my gratitude to all delegates for their full support, cooperation and contribution to the Forum and Conference 2015. I also wish to express my gratitude especially to the Dean of Faculty of Mathematics and Science, Prof. Dr. Cosmas Poluakan, M.Si, and to the Organizing Committee who dedicated their time and energy to attend meeting and for their hard work to make this conference a big success. However, should you find any shortcomings and inconveniences, please accept my apologies.

In closing, I realize that you are fully dedicated to the sessions that will follow but I do hope you will also take time to enjoy fascinating Manado with its tropical ambience.

Let me wish you all a productive conference and enjoyable stay here in Manado . Also I wish you all great success and this international conference will bring us fruitful benefits in education.

Thank you very much.

Syaloom

Wassalamu'alaikum warahmatullah wabarakatuh.

May peace and God's blessings be upon you all.

Manado, 8 August 2015

Rector,

Prof. Dr. Ph. E A Tuerah, M.Si, DEA

ICoMaNSEd 2015 C

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Prof. Dr. Ph. E. A

Prof. Dr. H. Luma

Dr. Adensi Timor

The Committee in Ch

Prof. Dr. Cosmas

Organizing Committee

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Dr. Hetty H. Lang

Dr. Tinny D. Kaur

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Dr. Anetha L. E. T

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Dr. Emma Moko,

Dra. Ch. Rompas,

James Mangobi, S

Sintia Hingkua, S

Septiani Palilinga

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Dr. Joan Lawalata

Ir. M.L.S. Taulu, M

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U. Satiman, Sp., M

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Abdon Saiya, S.Si.

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Drs. Ontang Manu

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Derel Kaunang, S.E

Dr. D.R. Wenas, M

Dr. J. Kimbal, M.Si

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Dr. Adensi Timomor, SH., MH.	(2 nd Vice Rector)

The Committee in Charge

Prof. Dr. Cosmas Poluakan, M.Si.	(Dean)
----------------------------------	--------

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Dra. Fanny Nanlohy, DEA., DHET	(Guide and Field Trip Division)
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Dra. M.L. Dumanauw, M.Si	(Banquet Division)
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Prof. Dr. J. Lolombulan, M.Si	(Proceeding Division)
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Prof. Dr. Sanusi Gugule, M.Si	(Proceeding Division)
Prof. Dr. Revelson Mege, M.Si	(Proceeding Division)
Dr. A. Komansilan, M.Si	(Proceeding Division)
Dr. A. Mandolang, M.Pd	(Proceeding Division)
Dr. F. Dungus, M.Si	(Proceeding Division)
Dr. J. Mamangkey, M.Si	(Proceeding Division)

FINAL SCHEDULE OF THE EVENTS: ICoMaNSEd2015

Saturday, August 08 2015			
07.00-08.00	Registration for ICoMaNSEd Participant	Grand Ballroom Lobby	
08.00-08.30	Opening Ceremony	Grand Ballroom	
08.30-08.45	Scienza Choir	MC: Dr. Hetty Langkudi, M.Pd.	
	Plenary Lecture I (Talk Duration for Every Keynote Speaker: 30 min)	Grand Ballroom	

EVENTS PROGRAM

FINAL SCHEDULE OF THE EVENTS: ICoMaNSEd2015

Saturday, August 08 2015			
07.00-08.00	Registration for ICoMaNSEd Participant		Grand Ballroom Lobby
08.00-08.30	Opening Ceremony		Grand Ballroom MC: Dr. Hetty Langkudi, M.Pd.
08.30-08.45	Scienza Choir		Grand Ballroom
08.45-10.00	Plenary Lecture I (Talk Duration for Every Keynote Speaker: 30 min)		
	• Prof. David F. Treagust, Ph.D, FSB, FAERA Curtin University, Perth, Australia "Current Issues in Science Education Research"		
	• Rebecca Johnson, MA. Columbia University, USA "Developing STEM and Environmental Literacy via 21 st Century Instruction"		
	• Prof. Dr. Otto Cornelis Kaligis, SH., MH. OCK & Associates, Indonesia "Legal Aspect of the Utilization of Natural Resources: Some Advocacy Experience in the Case of Exploitation of Natural Resources" Discussion (15 min)		Grand Ballroom Moderator: Mercy Rampengan, S.Pi., M.App.Sc., Ph.D.
10.00-10.15	Coffee Break + Poster Presentation		Grand Ballroom Lobby
10.15-12.00	Plenary Lecture II (Talk Duration for Every Keynote Speaker: 30 min)		
	• Ed van den Berg, Ph.D. Free University, Amsterdam, The Netherlands "Generating Pedagogical Content Knowledge in Science Teacher Education Student"		
	• Assoc. Prof. Dr. Vichit Rangpan Yala Rajabhat University, Thailand "Pattani Watershed Management for Sustainable in the Future"		
	• Prof. Dr. Syamsu Qamar Badu, M.Pd. State University of Gorontalo, Indonesia "Leadership in Higher Education: An Experience of State University of Gorontalo" Discussion (15 min)		Grand Ballroom Moderator: Dian O. Howan, S.Si., M.Phil.
12.00-13.00	Lunch + Poster Presentation		Grand Ballroom Lobby

Contributed Talk from Invited Speaker (Talk Duration for Every Invited Speaker: 20 min)				
Mathematics and Mathematics Education Room 1	Chemistry and Chemistry Education Room 2	Biology and Biology Education Room 3	Physics and Physics Education Room 4 & 5	Natural Sciences Education Room 6
Prof. Dr. Zulkardi, M.I.Komp., M.Sc., University of Sriwijaya, Palembang "Using PMRI and PISA for Improving Research and Learning on Mathematics Literacy of Indonesian Student"	Prof. Dr. Subandi, M.Si. Department of Chemistry, Faculty of Mathematics and Natural Science, State University of Malang (UM)	Dr. Slamet Suyanto State University of Yogyakarta (UNY)	Prof. Ferdy S. Rondonuwu, M.Sc., Ph.D. Satya Wacana Christian University, Salatiga "Carotenoids: From Photosynthetic Pigments to Biosolar Cells"	Prof. Dr. Liliasari, M.Pd. Natural Science Education, Indonesian Education University "Enhancing Students' Higher Order Thinking Skills Through Sciences Education"
Prof. Dr. Julius H. Lolombulan, MS. State University of Manado "Mistakes of Statistical Methodology in Educational Research"	Dr. Ir. Sri Nurdianti, M.Sc. Bogor Agricultural University "The Role of University to Raise STEM Performance in Indonesian Secondary Education"	Dr. Hj. Yuni Sri Rahayu, M.Si. Invited Speaker from State University of Surabaya (UNESA)	Kamisah Osman The National University of Malaysia	Prof. Drs. Manihar Situmorang, M.Sc., Ph.D. State University of Medan (UNIMED)
			Suwardi Annas, M.Sc., Ph.D. State University of Makassar (UNM)	
			Dr. Suharto Linuwih, M.Si. State University of Semarang (UNNES)	
Discussion (15 min)	Discussion (15 min)	Discussion (15 min)	Discussion (15 min)	Discussion (15 min)

13.00-14.00

PARALLEL SESSION

14.00-17.15

Contribute Talk from Oral Presentation Session I, II, III (Talk Duration for Every Presenter: max. 8 min)							
SESSION	Mathematics and Mathematics Education	Chemistry		Biology	Biology	Physics	
	ROOM 1	ROOM 2	ROOM 3	ROOM 4	ROOM 5	ROOM 6	ROOM 7
	Moderator:	Moderator:	Moderator:	Moderator:	Moderator:	Moderator:	Moderator:
14.00-14.08	080Math	023Chem	021ChemEd	027Bio	112Bio	0508BioEd	030Phys
14.08-14.10							
14.10-14.12							
14.12-14.14							
14.14-14.16							
14.16-14.18							
14.18-14.20							
14.20-14.22							
14.22-14.24							
14.24-14.26							
14.26-14.28							
14.28-14.30							
14.30-14.32							
14.32-14.34							
14.34-14.36							
14.36-14.38							
14.38-14.40							
14.40-14.42							
14.42-14.44							
14.44-14.46							
14.46-14.48							
14.48-14.50							
14.50-14.52							
14.52-14.54							
14.54-14.56							
14.56-14.58							
14.58-14.59							

Contribute Talk from Oral Presentation Session I, II, III (Talk Duration for Every Presenter: max. 8 min)

SESSION	Mathematics and Mathematics Education		Chemistry	Biology		Biology	Physics		Physics	
	ROOM 1	ROOM 2	ROOM 3	ROOM 4	ROOM 5	ROOM 6	ROOM 7	ROOM 8	ROOM 9	
	Moderator:	Moderator:	Moderator:	Moderator:	Moderator:	Moderator:	Moderator:	Moderator:	Moderator:	
14.00-14.08	080Math	023Chem	021ChemEd	027Bio	112Bio	050BioEd	030Phys	025PhysEd	029NSEd	
14.08-14.16	121Math	024Chem	031ChemEd	035Bio	114Bio	051BioEd	037Phys	029PhysEd	033NSEd	
14.16-14.24	163Math	049Chem	053ChemEd	038Bio	115Bio	088BioEd	043Phys	032PhysEd	039NSEd	
14.24-14.32	055MathEd	058Chem	076ChemEd	041Bio	116Bio	089BioEd	046Phys	034PhysEd	077NSEd	
14.32-14.40	063MathEd	073Chem		042Bio	126Bio	097BioEd	047Phys	036PhysEd	079NSEd	
14.40-14.48	083MathEd	074Chem		045Bio	132Bio	098BioEd		039PhysEd	086NSEd	
Discussion (10 min)										
15.00-15.15	COFFEE BREAK									
15.15-15.23	096MathEd	091Chem	085ChemEd	054Bio	145Bio	103BioEd	052Phys	040PhysEd	108NSEd	
15.23-15.31	104MathEd	092Chem	140ChemEd	057Bio	149Bio	128BioEd	062Phys	044PhysEd	109NSEd	
15.31-15.39	117MathEd	093Chem	141ChemEd	059Bio	152Bio	139BioEd	070Phys	048PhysEd	125NSEd	
15.39-15.47	119MathEd	098Chem	157ChemEd	067Bio	154Bio	143BioEd	071Phys	060PhysEd	130NSEd	
15.47-15.55	120MathEd	101Chem		068Bio	155Bio	158BioEd	100Phys	061PhysEd	134NSEd	
15.55-16.03	146MathEd	106Chem		072Bio	162Bio			064PhysEd		
Discussion (10 min)										
16.15-16.23	148MathEd	111Chem	131Chem	075Bio	164Bio	127PhysEd	118Phys	065PhysEd	135NSEd	
16.23-16.31	160MathEd	113Chem	147Chem	082Bio	165Bio	129PhysEd	138Phys	066PhysEd	136NSEd	
16.31-16.39	170MathEd	122Chem	161Chem	090Bio	166Bio	137PhysEd	142Phys	069PhysEd	144NSEd	
16.39-16.47	172MathEd	123Chem	169Chem	094Bio	168Bio	153PhysEd	150Phys	081PhysEd	151NSEd	
16.47-16.55	173MathEd	124Chem	176Chem	095Bio	171Bio	167PhysEd	159Phys	084PhysEd	156NSEd	
16.55-17.03	174MathEd			105Bio	175Bio			087PhysEd		
Discussion (10 min)										
17.15-18.30	B R E A K									
18.30-18.40	GATHERING AT LOBBY HOTEL FOR GALA DINNER									
19.00-21.00	CLOSING CEREMONY AND GALA DINNER AT MAYOR HOUSE									

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*Development Experiment Set of Planck Constant Value For
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*WTP-WTA Instrument for Controlling the Tourism
Destination Life-Cycle*

Paper ID : 077NSEd

**QUALITY OF SERVICES PERSONNEL MANAGEMENT IN DEVELOPING
CULTURAL EDUCATIONAL SCHOOL**

Novianty Djafri^{1*}

¹*Department of Management Education, Faculty of Education Science, State
University of Gorontalo, Gorontalo, Indonesia
noviantydjafri@yahoo.com

Abstract

Each school is responsible together in organization management through something that innovation in strengthening school culture. At the final destination which is expected by the school is the achievement of an organization that has a strengthening of the culture of the school is the best, but certainly there are obstacles in achieving that occur both in various fields, both academic and operational. The school goal is achieved or not is determined by the quality of human resources. Therefore, researchers focus of this paper on service quality administrative personnel. Problems in this paper to express ideas or thoughts about the author an important role in strengthening the school administrative staff of the school culture is the problem of this paper How is the quality of schools, the implementation of educational administrative personnel management, the efforts made and the results achieved in improving the quality of service management innovation administrative personnel education in schools through innovative development of a culture of service quality management education personnel. This paper is intended to express the idea or the author's thoughts on an important role in strengthening school education personnel, school culture of innovation in improving the quality management of Administrative service personnel. The method used is literature study with qualitative descriptive approach. The results of the literature review education personnel consists of personnel chief school administration, business and executive officers of special services. Implementation of the education process in schools through the support role. The school as a center of cultural value development can be done through the use of innovative processes and implementation of rules and policies in accordance with the technical guidelines and instructions implementation is. Efforts to implementation through the provision of excellent service to all elements of the inside and outside of school, both educators, students and the surrounding community.

Keywords: Personal, service, school, culture

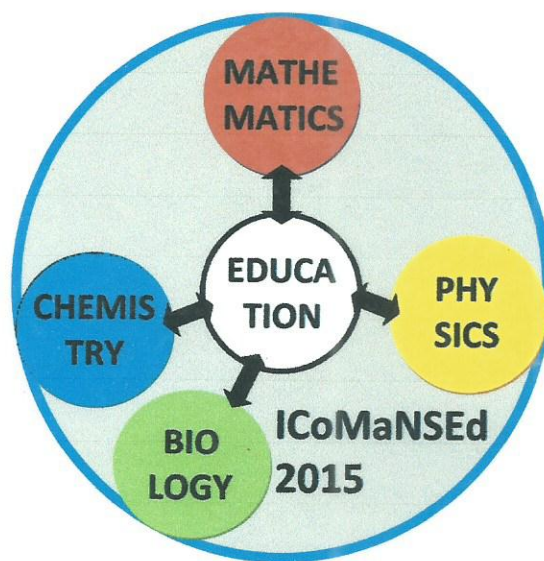
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Basic form of a large circle symbolizes Mathematics, Science and Education as an integral unit of basic education and basic science, and states the symbol of mathematics geometry. Five small circle-shaped model of molymod express linkage development areas of Mathematics and Science which are centered on education activities. Red for Mathematics states: spirit, gives energy, symbol, action, passion, strength and joy. Yellow for Physics states: warmth and happiness, cheerful symbol and optimistic spirit, stimulate the mind and mental activity. Green for Biology states: calm and relax, the impression of balance the emotions, the symbol of openness and communication, color of hope and the future, justice and peace. Blue for Chemistry states: the calming effect and professional impression and trust. Stimulate communication skills, artistic expression, symbol of strength, able to calm the mind and improve concentration. Generally as a corporate base color, gray for Natural Science Education states: security, reliability, simplicity, and maturity. White for Education states: freedom and openness, represent the purity impression, chaste clean, symbol of peace.



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