

Proceeding of The First Annual Seminar on Trends in Science and Science Education 2014

ISBN 978-602-9115-37-6

PROCEEDING

First Annual International Seminar on Trends in Science and Science Education 2014

Organized by Faculty of Mathematics and Natural Sciences
State University of Medan

5th – 6th December 2014
Garuda Plaza Hotel - Medan

Editors :

Prof. Dr. Herbert Sipahutar, M.Sc.
Prof. Drs. Motlan, M.Sc., Ph.D.
Prof. Dr. Mukhtar, M.Pd.
Prof. Drs. Manihar Situmorang, M.Sc., Ph.D
Alkhafi Maas Siregar, S.Si., M.Si.
Drs. Zulkifli Simatupang, M.Pd.



Penerbit :

Fakultas Matematika dan Ilmu Pengetahuan Alam
Universitas Negeri Medan
2015



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Zulkifli Simatupang, M.Pd

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Fakultas Matematika dan Ilmu Pengetahuan Alam
Universitas Negeri Medan
2015

FROM THE EDITORS

The First International Seminar on Sciences and Science Education, ISOSE, organized by Faculty of Mathematics and Natural Science of State University of Medan, was held on 4 – 5 December 2014 in Medan, North Sumatera, Indonesia. The seminar particularly encouraged the interaction of research students and developing academics with the more established academic community in an informal setting to present and to discuss new and current work. The high quality of the papers and the discussion represent the thinking and experience of experts and practitioners, researches, lecturers and students in their particular fields and interests. The papers contributed the most recent scientific knowledge known in science and science education.

This proceeding contains all the paper presented in the seminar, consisted of 11 papers of Biological Sciences, 11 papers of Chemical Sciences, 3 papers of Mathematical Sciences, 14 papers of Physical Sciences and 39 papers of Science Education.

In addition to the contributed papers, an outstanding keynote presentation on National Curriculum 2013 was made by Prof. Dr. Syawal Gultom (formerly Rector of State University of Medan, Unimed), now as Head of Badan Pengembangan Sumberdaya Manusia Pendidikan of Department of Education and Culture of Republic of Indonesia. This presentation gives all participants a new and comprehensive perspective on the orientation of national education in the next era.

Two invited keynote presentations were given by Prof. Dr. Yaya Rukayadi from Department of Food Science, Faculty of Food Science and Technology and Laboratory of Natural Products, Institute of Bioscience, Universiti Putra Malaysia, Serdang, Selangor DarulEhsan, Malaysia who spoke on how to appreciate the nation through research javanese turmeric or temulawak (*Curcuma xanthorrhiza* ROXB.), and by Dr. Phattrawan Tongkumchum, Department of Mathematics and Computer Science, Faculty of Science and Technology, Prince of Songkla University, Pattani, Thailand who spoke about the applications of the weighted sum contrasts methods on graphing confidence interval for adjusted mean, their used for comparing two and several groups, and adjustment for covariates.

We would like to express our deep appreciation to Prof. Dr. Ibnu Hajar, Rector of State University of Medan for financial support by means of Dana DIPA Unimed FY 2014. We would like to express our deep appreciation to Prof. Dr. Motlan (Dean of FMIPA Unimed), all sponsors, all member of seminar committee, that make the seminar happen in a great success.

We thank all authors and participants for their contributions.

Medan, February 2015

Editors

FROM THE CHAIRMAN OF THE ISOSE 2014

Your Excellency, Bapak Prof. Ibnu Hajar Damanik, Rector of Universitas Negeri Medan (State University of Medan)

Your Excellency, Bapak Prof. Khairil Ansari, Academic Affair Vice Rector of Universitas Negeri Medan

Your Excellency, Bapak Chairul Azmi, Financial Affair Vice Rector of Universitas Negeri Medan

Your Excellency, Bapak Prof. Biner Ambarita, Students Affair Vice Rector of Universitas Negeri Medan

Your Excellency, Bapak Prof. Berlin Sibarani, Cooperation Affair Vice Rector of Universitas Negeri Medan

Your Excellency, Bapak Prof. Motlan, Dean of Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Negeri Medan

Your Excellency, Bapak and Ibu Deans of Faculties in Universitas Negeri Medan

Your Excellency, Bapak Prof. Drs. Manihar Situmorang, M.Sc., Ph.D., Head of Research Institute of Universitas Negeri Medan

Your Excellency, Bapak Dr. Ridwan Abdullah Sani, M.Si., Head of LPM of Universitas Negeri Medan.

Distinguished experts, researchers, lecturers, students, guests, and all participants, ladies and gentlemen.

Good morning and welcome to Medan, North Sumatera.

Before I begin with a few words please understand that our keynote speaker, His excellency Bapak Prof. Syawal Gultom, Head of Badan Pengembangan Sumberdaya Manusia Pendidikan is on the way right now. Hopefully, this does not lessen the meaning of this seminar, because he will be with us in the next several minutes and gives his talk in this room.

First, let us be thankful to the one and all-powerful God that on this fine morning we are still given bodily and spiritual health and can gather together in this room, on our beloved capital city of North Sumatra, Medan.

Next, to our invited speakers Prof. Yaya Rukayadi (from University Putra Malaysia), Prof. Phattrawan Tongkumchum (from Prince Songkla University, Thailand), and Dr. Thomas Ouhel

(from Prague University, Check) we also want to extend a warm and special welcome to this seminar.

This seminar, International Seminar on Trends in Science and Science Education 2014 is specially organized by Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Negeri Medan. The seminar is planned to be held regularly on annual based as an attempt of FMIPA Unimed to prepare a good vehicle to our lecturer, researchers, students and all human resources to communicate, exchange and disseminate their experiences at the international level. The main objective of this seminar is to encourage collaboration among the different actors in science and science education community so as to achieve a better result for the benefit of the community. This first annual international seminar will be held from December 5 – 6, 2014.

It is expected that those who participate in the seminar will afterwards be familiar to be able to interact with their international counterparts in their scientific area. To make this interaction happen, the lecturer, researchers, and students should be able to improve the research quality in their respective domains. Hopefully, by organizing the regular international seminar, will help not only Fakultas Matematika dan Ilmu Pengetahuan Alam but also Universitas Negeri Medan to realise its dream to a world class and character building university.

Approximately 300 participants from four different countries are attending this seminar. They come from Chech Republic, Thailand, Malaysia, and of course from Indonesia. Most of the participants are lecturers, researchers, teachers and students, so we hope that a deep mutual interaction will unfold. The participants come from different backgrounds and institutions. Some are from government institutions, some from research institutions and universities, and some are from NGOs.

Approximately 100 seminar abstracts and full papers from science education, biology, chemistry, physics, and mathematics sciences have been received by the seminar committee. Most of the abstract have been edited and bound into an abstract collection book which is a part of the seminar kit. The seminar full papers are now in editing stage by the committee before publish in seminar proceeding that will be available in both printed and on-line forms, in the next January 2015. Please, remind the committee if you want to get the copy of the seminar proceeding.



I would like to take this opportunity to acknowledge the important role of the honorable Prof. Ibu Hajar, rector of Universitas Negeri Medan for giving us his full support and attention and for providing his precious time to be with us and to honour us by opening this seminar.

Our sincere thanks also goes to the honorable Prof. Motlan, Dean of Fakultas Matematika dan Ilmu Pengetahuan Alam, who have lead and encourage all the committe members to be always focussed and worked hard even in a very short period of time to prepare the seminar.

I would also like to thank His Excellency Prof Syawal Gultom, former Rector of Universitas Negeri Medan, and now Kepala Badan Pengembangan Sumber Daya Manusia Pendidikan, Departemen Pendidikan dan Kebudayaan Republik Indonesia, for being willing to share his experiences, knowledge and skills with us.

My sincere thanks also goes to all members of the committe and to all staff of Fakultas Matematika dan Ilmu Pengetahuan Alam for their continuous support and hard work because without their assistance this seminar may not have taken place today.

As Newton stated in his second law of motion, "Every body continues in its state of rest, or of uniform motion in a straight line, unless it is compelled to change that state by forces impressed upon it". It is time for us (as lecturers, researchers, students and all staffs of the faculty or university) to apply the necessary force to our specific daily role in order to make our motions converge more closely. Where better to start than on science and education, which will form the foundation of our development and character as the 21st century unfolds.

Finally, I conclude my speech by kindly inviting Honourable Prof. Ibnu Hajar Damanik, Rector of Universitas Negeri Medan, to give special direction and officially open the seminar.

We wish you good luck and success in this endeavour.

Thank you for your attention.

Medan, December 5, 2014

Herbert Sipahutar
Chairman of the Seminar Committe

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