

## **PROCEEDINGS**

### The 3<sup>rd</sup> International Seminar on Science Education "Challenging Science Education in The Digital Era"

#### Responsible Persons:

Prof. Dr. Sunaryo Kartadinata, M.Pd. (IUE Rector)

Prof. Furgon, Ph.D. (Director of SPs IUE)

Prof. Dr. Liliasari, M.Pd. (Head of Science Education Program, SPs UPI)

#### **Steering Committee:**

Dr. Agus Setiawan, M.Si., Dr. Agus Setiabudi, M.Si., Dr. Ari Widodo, M.Ed.

#### Editor:

I Gede Rasagama, Muh. Tawil, Suatma, Ajat Sudrajat, Rudy Hidana, Ketang Wiyono, Abdul Haris Odja, Al Husni, Samsul Bahri

# SCIENCE EDUCATION PROGRAM GRADUATE SCHOOL INDONESIA UNIVERSITY OF EDUCATION (IUE)

FOREWORD OF CHAIR OF THE SCIENCE EDUCATION PROGRAM

This seminar conducted to fulfill annual agenda of Science Education Program of IUE

Graduate School. This is the third international seminar that has been conducted by the

program.

Nowadays many educational problems faced in Indonesia. Rapid development of the

number of students, subject matter concepts, but limitation time, and many abstract science

concepts, caused difficulties in students learn. There is also disparity of educational quality

in many schools in Indonesia those have difficulties to get information in rural area. The

development of information and communication technology in this digital era is the answer of

the problems. Therefore it needs exchanges information between science education

researchers all over the world and our seminar theme is "challenges in science education to

face digital era". Through discussion in the seminar it hoped to get effort of digital learning

science to build scientific literate society that have long life education.

I would like to express my special gratitude to Prof.Dr.Kazue Tazaki from Kanazawa

University Japan, Prof.Dr.Roy Tasker from University of Western Sidney Australia, and Dr.

Aloysius Rusli from Bandung Institute of Technology; who are specially come here to be

keynote speakers. Thank you for sharing your latest research with us.

Finally I would like to thank to the committee, to the sponsors, to all speakers and

participants and everyone who participated in publishing the seminar proceedings.

Bandung, 17 October 2009.

Chair of Science Education Program,

Graduate School IUE;

Prof. Dr. Liliasari, M.Pd.

ii

#### **TABLE OF CONTENTS**

Editor	i
Foreword of Head of Science Education Program	ii
Table of Content	iii

Key	Keynote Speakers				
No	Presenters	Institution	Title	Pages	
1.	Kazue Tazaki	Kanazawa University Japan	Current Perspective on Nanotechnology for Environmental Geomicrobiology and Biomineralogy	1	
2.	Roy Tasker	University of Western Sydney, Austraslia	Research into Practice: Visualisation of the Molecular World for a Deep Understanding of Chemistry	8	
3.	Liliasari	Indonesia University of Education	The Effect of Interactive Multimedia Functions to Enhance Students' Generic Science Skills	26	
4.	Aloysius Rusli	Parahyangan Catholic University and Institut Teknologi Bandung, Indonesia	Three Challenges: Facts, Faith, and Hazing	35	

Biology Education				
No	Presenters	Institution	Title	Pages
1.	A. Wahab Jufri	Mataram University	Implementation of the Inquiry Based Learning Kit through Cooperative Learning Strategy to Develop Attitudes of SMA student in Mataram	43
2.	Ari Widodo	Indonesia University of Education	Dual Mode Inservice Training: An Alternative Model for Teachers Professional Development (PD) in Indonesia	51
3.	D. Setiadi	Mataram University	The Correlation of Learning Styles and Students' Achievement: A Basic Consideration in Developing Biological Instructions	63
4.	Evi Apriana	Serambi Mekkah University, Banda Aceh	Application of Society Technology Science (STS) Approach with Role Playing Method to Improve Comprehension of Senior High School Students' of Biological Natural Resources Conservation	69
5.	Faturrahman	Mataram University	The Application of Probiotic Effective Microorganism-4 in Abalone (Haliotis asinina Lin. 1758) Larval Reaing	76
6.	Fenny Roshayanti	IKIP PGRI Semarang	Profile Sosiocultural Perspective Biological Teacher Candidate Student in Argument at Lecturing of Human Physiology	84
7.	Fransisca Sudargo Tapilouw	Indonesia University of Education	Pedagogical Competence of Pre-service Biology Teacher on Conducting Inquiry Approach to Develop Science Process Skill	94
8.	Gita Nurul Puspita	SMP Negeri 2 Cimahi	The Use of Popular Movie Clips in Learning of Excrettion System	104
9.	Handoko Santoso	FKIP UM Metro	Teachers' And Students' Respons To The Inquiry Learning And Cooperative Strategy At SMA Students Which High And Low Academic Abilities at Kota Metro Lampung	112

	ı		T T	
10.	Herfen Suryati	Guru SMA YPVDP Bontang	The Use of Epidermis/Onion Skin as Semipermeable Membrane to Prove Diffusion Osmosis Phenomeon and Its Application in The Process of Making Seaweed Sweets	121
11.	Meilinda	Indonesia University of Education	Interactive E-Module of Constructivism Based on Genetic Material to Increase The Concept Mastery of Biology Teachers in Secondary School	129
12.	Muhfahroyin	Univ. Muhammadiyah Metro	The Effect of ICT Based Learning Guided By STAD and Academic Ability on Biological cognitive learning out comes students' of SMA Kota Metro	138
13.	Nina Rosliana	STIKES Bina Husada Bandung	The Relation of Exclusive Mother Breast Feeding Supply's History, Nutrient Status, Environment with Diarrhea of Children under five years old at Sukarasa Public Health Center at Bandung City 1 July to 7 August Periode 2008	150
14.	Riandi	Indonesia University of Education	The Impact of Information Technology-Based Course (GenTIK) on Students' Critical Thingking Skills	170
15.	Rudy Hidana	STIKes Bakti Tunas Husada Tasikmalaya	Student Status Influence to The Public Health Principles Knowledges in The Relationship with Attitude and Beahvior of to Environment Health	176
16.	Siti Fadjarajani	Siliwangi University of Tasikmalaya	Agricultural Land Conversion Influence To Continuity of Area of in Kawasan Bandung Utara	184
17.	Siti Sriyati	Indonesia University of Education	Function of Concept Diagram as Formative Assesment Form to Improve Student Motivation in Botani Phanerogamae Course	192

Chemistry Education				
No	Presenters	Institution	Title	Pages
1.	Abdul Hadjranul F.	Indonesia University of Education	Applied Lesson Study on Chemistry Learning by Experiment Method Based on Local Material	200
2.	Abdullatif Nusu	Haluoleo University	Scafolding on Writing Direct Instruction Lesson Plan and Conducting Peer teaching for Pre- Service Chemistry Teacher	209
3.	Aliefman Hakim	University of Mataram	Scrining Phytochemistry on The Heartwood and The Root Bark of The Artocarpus Camasi (Moraceae)	220
4.	Cucu Zenab Subarkah	Sunan Gunung Djati Bandung	Efforts to Improve Students Conceptions About Electrolysis by Applying Remedial Teaching Using Animated Presentation Media	225
5.	Hartono	Sriwijaya University	Teaching Science Practical Course in Blended Learning Environment	233
6.	I Wayan Redhana	Ganesha University of Education	Application of Argument Mapping-based Learning Model to Improve Students' Critical Thinking Skills in Thermochemistry Topic	243
7.	Ida Farida	UIN Sunan Gunung Djati Bandung	The Importance of Competence Representational in Chemical Problem Solving Through Interactive Multimedia	255

8.	I Nyoman Suardana	Ganesha University of Education	Implementation of Problem Based Learning by Using Module to Improve Learning Process and Student's Learning Achievement in Electrocehemistry Concept	264
9.	Muhammad Anwar	State University of Makassar	Developing Physical Chemistry Course to Improve Generic-Skills for Prospective Chemistry Teachers	278
10.	Nancy Susianna	Universitas Pelita Harapan	Implementation of Science Technology and Society Learning Model and Contextual Teaching and Learning Approach to Improve Creativity of Senior High School Student in Chemistry	285
11.	Solfarina	Tadulako University	Readiness of Prospective Chemistry Teachers to Face Implementation of Information technology in Education	294

Physics Education				
1.	Abdurrahman	Lampung University	Student's Representations Preference In Learning Physics and "Thematic Pre-Conceptions" In Quantum Physics Concept	304
2.	Achmad Samsudin	Indonesia University of Education	Using Of "Cels" In Basic Physics Experiment To Improve Learning Motivation And To Develop Performance Skills Of Student	314
3.	Andi Suhandi	Indonesia University of Education	Influence Grain Problem In Form Against Animation Concept Understanding Test Results Refraction of Light	321
4.	Chaerul Rochman	UIN SGD Bandung	Physics Learning Urgency that Integrate Value Islam	328
5.	Didi T. Chandra	Indonesia University of Education	Analysis of Correlational Study among Students' Physics Ability, Technological Literacy and Creativity on Basic Technology Education Program in Junior High School	336
6.	Dwi Susanti	Jakarta State University	Virtual Laboratory Use in Optical Activity in Practicum Inkuiri to Enhance Understanding The Concept of Student Teacher Candidate	349
7.	Dzikri Rahmat Romadhon	Student in Indonesia University of Education	Student's science process skill profile After implementation of inquiry based laboratoryTo analyze parabolic motion	359
8.	Eka Cahya Prima	Indonesia University of Education	Problem Solving Laboratory as an Alternative Physics Experiment Activity Model Implemented in Senior High School	370
9.	Endi Suhendi	Indonesia University of Education	The Use Of E-Learning Based Moodle To Increase Student's Discuss Participation In a Big Class Of General Physics Lecture	381
10.	Gunawan	University of Mataram	Developing Virtual Laboratory for Teaching Modern Physics	386
11.	I Gede Rasagama	State Polytechnic of Bandung	Improving of Critical Thinking Skils D3 Students' of Bandung State Polytechnic Pass Learning of Vibration Bases on Inquiry	396
12.	I Ketut Mahardika	Jember University	The Improve a Physics Student Achievement With Quantum Teaching Model Endorsed by an Interactive Power Multimedia CD	407
13.	Ida Sriyanti	University of Sriwijaya	Nanocomposite Prepared by Simple Mixing Method	415

14.	Indrawati	Jember University	Improving The learning Activity and The Skill of Developing Physics Instructional Media to The Students of Physics Education Program Faculty of Teacher Training and Education Jember University Even Semester Year 2007-2008	421
15.	Judyanto Sirait	Tanjungpura University	Cognitive Conflict Approach to Increase Critical Thinking of The Students in Physics	429
16.	Jusman Mansyur	Tadulako University, Palu	Phenomenographic Study Of Students' and Teachers' Strategies In Physics Problem Solving	439
17.	Kartini Herlina	Lampung University	Implementing Problem-Based Learning For Student Of 6 <sup>th</sup> Semester In Teacher Training Of Physics In Optic's	453
18.	Ketang Wiyono	University of Sriwijaya	Using Computer Simulation To Improve Concept Comprehension Of Physics Teacher Candidates Students In Special Relativity	461
19.	Kosim	Mataram University	Developing Devices of Multimethod Learning in Physics Courses for B-Package at PKBM Lombok Tengah District	468
20.	Leni Marlina	University of Sriwijaya	Nanoparticle SiO <sub>2</sub> Preparated By Simple Milling Method	479
21.	Lidia Mubarrak	First State Islamic Secondary School	The Web-Based Learning Model On Dynamic Fluid Concept To Improve Student's Science Generic Skills	484
22.	Lovy Herayanti	IKIP Mataram	Problem Based-Learning with Inquiry Approach to Improve Students' Understanding on Electric Static Concepts	496
23.	Manat Simanjuntak	Senior High School PLUS Palangkaraya	Conceptual Interactive Learning Approach To Improve Student's Mastering Concepts And Communication Skill On Static Fluid	504
24.	Mohammad Noor Faizin	Semarang State University	Interactive Flash Modeling (IFM) Usage To Reduce Misconception In Dynamic Electrical And To Improve The Students's Learning Attitude	516
25.	Muh. Tawil	Makassar State University	Formal Common Sense Ability, and Area Of Education Of Family Related To Result Of Student Physics Learning Class X SMA Negeri 1	526
26.	Muhamad Yusup	University of Sriwijaya	A Study Of Students' Representational Competence On Concepts Of Electrostatics Topic	536
27.	Muhammad Ali	Tadulako University	Tool Development Studies Simple Science of Goods Quality Used to Improve Elementary Science Learning on the Remote Region in Donggala	544
28.	Ni Made Pujani	Ganesha University of Education	Implementation of STAD Type Cooperative Learning Models to Improve The Quality Of Students' Learning Process And Scientific Literacy On Fundamental Physics I	550
29.	Nurjannah	FKIP UNTAD	Gender Differences In Physics Motivation	560
30.	Nyoto Suseno	Muhammadiyah University of Metro	The Importance of Maping and Utilizing Analogies in Learning of Abstract Concepts on Electricity and Magnetism	563

31.	Oni Rizali	Senior High School 1 Kundur Kab Karimun-KEPRI	The Use Of Virtual Simulation Media In Learning With The Interactive Conceptual Approach To Develop The Understanding Of Physics Phenomena In Electrostatic	573
32.	Rd. Bagus M.W.A	Indonesia University of Education	Profile of Student's Experiment Abilities after Laboratory by Inquiry Applied In Their First Experiment Activity	581
33.	Sahrul Saehana	Tadulako University	Development of Computer Simulation in Cooperative Learning Model To Minimize the Misconception Physics in high school students in Pal	589
34.	Samsul Bahri	Serambi Mekkah University	Application Of Cooperative Learning With Material Assignment Towards Topic Of Direct Current Electrical Circuit	596
35.	Sardianto Markos Siahaan	University of Sriwijaya	Preliminary Studi On The Using Amazing Physics Interactive Multimedia	606
36.	Sarwanto	State University of Solo	Prey Calendar System Institution in the Era of Information Technology	613
37.	Sondang R Manurung	Medan State University	Use Of Computer Visualization In Quantum Physics Learning Design For Enhancement Of The Quality Of Teacher Candidates In Physics LPTK	623
38.	Susilawati	Sriwijaya University	Implementation Of Survey, Question, Read, Recite And Review (SQ3R) Method On Physic Teaching In Grade X Senior High Schoo Srijaya Negara Palembang	633
39.	Taufiq	Sriwijaya University	The Application of Hypothetical Deductive Learning Cycle Learning Model to Improve Senior High School Students' Science Generic Skills on Rigid Body Equilibrium	641
40.	Viyanti	Lampung University	Using Of Performance Assessment To The Fluid Experiment Inquiry Based To Increase The Student Mastery Concept	649
41.	Wahono Widodo	Surabaya State University	The Development of Interactive Multimedia on Introductory Physics Learning for Prospective of Vocational High School Teachers in Foods Program	657

Sci	ence Educatio	n		
1.	Agus Fany Candra	Indonesia University of Education	Collaborative Ranking task (CRT) in e- Learning Support System to Improve The Mastery of Earth and Space Science Concept for Future Physics Teachers	668
2.	Arif Hidayat	Indonesia University of Education	The Importance of Science Education as Global Challenge Answer: International Program on Science Education (IPSE) Curriculum Analysis	677
3.	Chaerun Anwar	Centre for Development of Teachers and Education Personnel in Science,	Problem Solving Practices of Science Teachers in Senior High School	684
4.	Dandhi Kuswardhana	Indonesia University of Education	Media Design of ICT Based Lesson Study for Learning Community of Junior High School Science Teachers and to Improve Quality of Elementary Education in West Java	692

5.	Enjang Akhmad Juanda	Indonesia University of Education	ICT Implementation Based Learning In Lesson Study To Develop Science Learning Community For ScienceTeachers In Order Improving The Quality Of Basic Education In West Java	699
6.	Esther Sanda Manapa	Hasanudin University	The Profile of Oceanic World Through The Eyes of Indonesia Elementary Students' Perspective, (Case study: Students from grade 4 <sup>th</sup> ,5 <sup>th</sup> , and 6 <sup>th</sup> )	709
7.	Haratua Tiur Maria.S	Tanjungpura University, Pontianak	Developing Design and Science Education Tools Using The Implementation of The Integrated Teaching-Learning Approach in Multigrade Primary School in West Kalimantan	718
8.	Judhistira Aria Utama	Indonesia University of Education	Prototype of Remote Telescope as a Tool of Astronomy Learning for Students	727
9.	Suciati	UNINUS Bandung	Improving Skill's Class Teacher on Concept in Network Integration Through The Use of Model "Sun-Squid Maping" IPA Integrated Learning in School Foundation Speak in The Framework of Digital Area	733
10.	Tri Jalmo	Lampung University	Training of Improving Competence of Junior High School Teachers in Developing Learning Outcome Test Items Using Scaffolding Strategy	741
11.	Yunita	State Islamic University of Sunan Gunung Djati, Bandung	Alternative of Teaching Strategy (ATS) as Relevant Model on Lesson Learn to Improve on Science Lesson in State Islamic Middle School (MTs) of Serang, Banten Province	749
12.	Erman	Surabaya State University	The Intervention Model In Science Teaching Process Of 4 <sup>th</sup> Grade Students Of Elementary School	756