



# CERTIFICATE

Present to

**Jaslin Ikhsan, Ph.D.**

as

**Presenter**

**The 1<sup>st</sup> International Seminar on Chemical Education 2015  
(ISCE 2015)**

**Abdul Kahar Muzakkir Conference Hall, Universitas Islam Indonesia (UII)  
Yogyakarta, 30<sup>th</sup> September 2015**



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# PROCEEDING



## The 1<sup>st</sup> International Seminar on Chemical Education 2015 (ISCE 2015)

**“Chemistry Education as an Industry Development’s Agent in Indonesia”**

Abdul Kahar Muzakkir, Conference Hall  
30<sup>th</sup> September 2015  
UNIVERSITAS ISLAM INDONESIA

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Department of Chemistry Education  
Faculty of Mathematics and Natural Sciences  
UNIVERSITAS ISLAM INDONESIA



# Proceeding

**The 1<sup>st</sup> International Seminar on Chemical Education 2015  
September, 30<sup>th</sup> 2015**

## **Preface**

International Seminar on Chemical Education 2015 (ISCE 2015) is conducted by Departement of Chemistry Education, Faculty of Mathematics and Natural Science, Islamic University of Indonesia, Yogyakarta at September 30, 2015. This conference was also prepared to celebrate 72<sup>th</sup> anniversary of Islamic University of Indonesia. The seminar under the theme Chemistry Education as an Industry Development's Agent in Indonesia.

The aim of the seminar is to explore and develop the concept of learning, innovation and competence building as a chemistry education framework. The objective of ISCE is to stimulate the establishment of knowledge based strategies or teaching development in Senior High School and College. The idea of the seminar is to bring together interesting issues about what is going on ASEAN countries, school, university and to share experience regarding methodology of design thinking in teaching area.

The papers ware distributed in 6 topics, they ware chemistry education curriculum and policy, teacher learning and education (in-service and pre-service teachers), student learning in K-12 levels, chemistry education, at tertiary levels, enviromental and social issues in chemistry, and chemistry education effect on industry development.

The seminar was organized by Departement of Chemistry Education, Faculty of Mathematics and Natural Science, Islamic University of Indonesia, Yogyakarta, Himpunan Kimia (Indonesia Chemical Society), and Himpunan Kimia Indonesia Cabang Yogyakarta (Chemical Chemical Society Yogyakarta Branch) and supported by Directorate General of Higher Education (DGHE), *Ministry of Research and Technology and Higher Education*, Republic of Indonesia. In this seminar, we hope that many experts will come together at Yogyakarta and we would like to discuss exchange the information about the recent chemistry research and also interchange each other.

**Chief of Organizing Committee**

**Riyanto, Ph.D.**

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## **Welcoming Address by the Organizing Committee**

*Assalamu'alaikum Wr. Wb.*

Honorable Rector of Universitas Islam Indonesia  
The distinguished invited speakers, and  
All participants of the ISCE 2015

Welcome you at the 1<sup>st</sup> International Seminar of Chemical Education 2015 (ISCE 2015) this morning here at the Auditorium Kahar Muzakkir Universitas Islam Indonesia, Yogyakarta. The international conference is an annual conference of the Department of Chemistry Education, Indonesian Chemical Society (Himpunan Kimia Indonesia, HKI), Yogyakarta branch and supported by Directorate General of Higher Education (DGHE), Ministry of Education and Culture, *Ministry of Research and Technology and Higher Education*. This conference was prepared to celebrate 72<sup>th</sup> anniversary of Universitas Islam Indonesia. This conference with the theme Chemistry Education as an Industry Development's Agent in Indonesia.

The conference comprises both oral and poster presentation in English and Indonesian with conference publication of full papers in Proceeding Conference. There are 43 papers presented orally and poster covering wide-variety subjects of chemical education and chemistry. We would like to thank to all the participants ISCE 2015. The seminar participants ISCE 2015 came from lecturer, researchers, teachers and students. Special thanks to the invited speakers:

1. Prof. Nobuyoshi Koga, Ph.D. C.Sc. from Graduate School of Education Hiroshima University, Japan.
2. Prof. Binyo Panijpan from Mahidol University, Thailand.
3. Prof. Kamisah Osman from University Kebangsaan Malaysia, Malaysia.

*Thanks your very much to Ministry of Research and Technology and Higher Education, Republic of Indonesia for financial support.*

We hope you will enjoy a pleasant and valuable seminar at Universitas Islam Indonesia.

*Wassalamu'alaikum Wr. Wb.*

Chairman  
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## **Opening Speech from the Dean of Faculty of Mathematic and Natural Sciences, Universitas Islam Indonesia**

Welcome you at the 1<sup>st</sup> International Seminar of Chemical Education 2015 (ISCE 2015) at Department of Chemistry Education, Faculty of Mathematic and Natural Sciences, Universitas Islam Indonesia, Yogyakarta. This conference was prepared to celebrate 72<sup>th</sup> anniversary of Universitas Islam Indonesia.

The 1<sup>st</sup> International Seminar of Chemical Education 2015 (ISCE 2015) will be the 1<sup>st</sup> event in the ISCE conference series, started in 2015, that brings together individuals involved in chemistry related fields (education chemistry, chemistry, pharmacy, environmental science, chemical engineering, molecular biology, material science, etc.) or institution in chemistry-related sectors.

ISCE 2015 will be organized by Department of Chemistry Education, Indonesian Chemical Society (Himpunan Kimia Indonesia, HKI), Yogyakarta branch and supported by Directorate General of Higher Education (DGHE), Ministry of Education and Culture, *Ministry of Research and Technology and Higher Education, Republic of Indonesia*.

Special thanks to the invited speakers, Prof. Nobuyoshi Koga, Ph.D. C.Sc. from Graduate School of Education Hiroshima University, Japan, Prof. Binyo Panijpan from Mahidol University, Thailand and Prof. Kamisah Osman from University Kebangsaan Malaysia, Malaysia.

Congratulations to the ISCE 2015 committee for this conference.

Thanks you're very much.

**Dean of Universitas Islam Indonesia**

**Drs. Allwar, M.Sc., Ph.D.**

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## **Opening Speech from the Rector of Universitas Islam Indonesia**

*Assalamu'alaikum Wr. Wb*

The distinguished invited speakers, and all participants of the First International Seminar on Chemical Education 2015 (ISCE 2015).

Firstly, I would like to express my great appreciation to the Department of Chemistry Education UII as one of the organizers of the program the First International Seminar on Chemical Education 2015 (ISCE 2015) with the theme Chemistry Education as an Industry Development's Agent in Indonesia.

I am proud that this interesting event is being organized and held in Yogyakarta. As the biggest and the oldest private university in Yogyakarta, University Islam Indonesia is committed to the excellence in research and teaching. Recently, we are preparing UII as one of the world class universities. Knowing that committee has selected outstanding speakers from various prestigious institutions. I believe that all of the participants will enjoy the discussion of issue covered by the topic of this seminar.

Finally, I would once again like to thank the organizer for organizing this event, and to thank all the participants attending this ISCE 2015 event as well as delivering their scientific presentations. I do really hope that you can enjoy this seminar and have excellent stay in Yogyakarta.

*Wassalamu'alaikum Wr. Wb.*

Dr. Ir. Harsoyo, M.Sc.

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## Integration of Local Wisdom into Web-based Chemistry Learning at First Grade of Senior High School to Improve Students' Learning Discipline

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### Abstract

Indonesian government has supported the integration of local wisdom into education as stated on the Act No. 20/2003 on National Education System and the Regulation of the minister of Education and Culture No. 81A/2013. Indonesian education is also affected significantly by the advance of information technology. This research was an experimental research on online Chemistry learning into which local wisdom of Purworejo, Central Java, Indonesia was integrated. The research was to measure the difference of students' learning discipline at a senior high school in Purworejo (SMAN 1 Purworejo) between students who learnt chemistry with local wisdom integration into web-based chemistry learning and that without it. Students' prior discipline was measured before the treatments by use of a questionnaire. The treatments included submission of assignments, presentation, essay writing, and discussion in a cultural-organization-based group. The group represented the structure of management of village leaders throughout Purworejo regions. Data of students' learning discipline from both groups were compared using independent sample t-test of SPSS from which learning discipline of students with the treatment was significantly different from that without treatment (Sig.p < 0.000). Therefore, learning discipline of students who studied with integration of local wisdom into web-based chemistry learning was different significantly from that without the integration of local wisdom.

**Keywords:** local wisdom, web-based learning, chemistry, learning discipline

### Introduction

Purworejo is a region that has many potential sources of local wisdom to be integrated into chemistry education. The sources of local wisdom should be explored and practiced in Chemistry learning at senior high schools as valuable investigation. The latest curriculum suggests the integration of local wisdom into teaching and learning on any subject as an effort of strengthening local wisdom for students. This is also one of the efforts to build students' characters as stated in the Regulation of the Minister of Culture and Education No. 81 A (2013) which declares that a local knowledge is a study that improves the comprehension of the students' region potency, aiming to improve attitude, knowledge, and skill. Indonesian system of education supports educational development based on the potencies of a region as it is declared in the act of the Republic of Indonesia No. 20 Year 2003 on National Education System.

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Nowadays, the strength of digital media in education is so high. Based on the fact, educators developed and used various types of media in education to improve the quality of learning. Therefore, nowadays students can gain information and knowledge from various digital media. One of the media which is widely used in learning is web-based media. With the media, students can have high flexibility in learning. Flexibility of learning is closely related to discipline, which is student' internal factor affecting successful learning. Discipline in learning is very important to build consistency and sustainability in learning. Learning discipline should be a part of students' moral which is important for learning. This study investigated the integration of local wisdom into web-based Chemistry learning, and to compare the learning discipline of students who learnt chemistry with integration of local wisdom into web-based chemistry learning and that without the integration.

## **Research Method**

This research was an experimental study with one factor research design and two samples. One factor was the effect of the integration of local wisdom into web-based learning. Two samples of the research consisted of one group as treatment class and the another group as the control class. One set of questionnaire were developed to collect data. The questionnaire was construct-validated by lecturers and counseling teacher. There were 14 of 29 statements of the questionnaire were valid based on the empirical validation process, responded by 31 students. The questionnaire was written in Likert Scale with five alternative answers. The alternative choices were: *Sangat Sesuai (SS)*, *Sesuai (S)*, *Cukup (C)*, *Kurang Sesuai (KS)*, and *Tidak Sesuai (TS)*.

## **Data Analysis**

This research used independent sample t- test of SPSS to measure the difference of students' learning discipline due to the integration of local wisdom into web- based chemistry learning. The reliability of the test was also analyzed by using Cronbach Alpha Formule of SPSS. Homogeneity of sample and normality of data distribution were tested before the data was tested. Fisher test was used for the homogeneity test and Kolmogorof- Smirnov was for the normality.

## The Diagram of Research Design

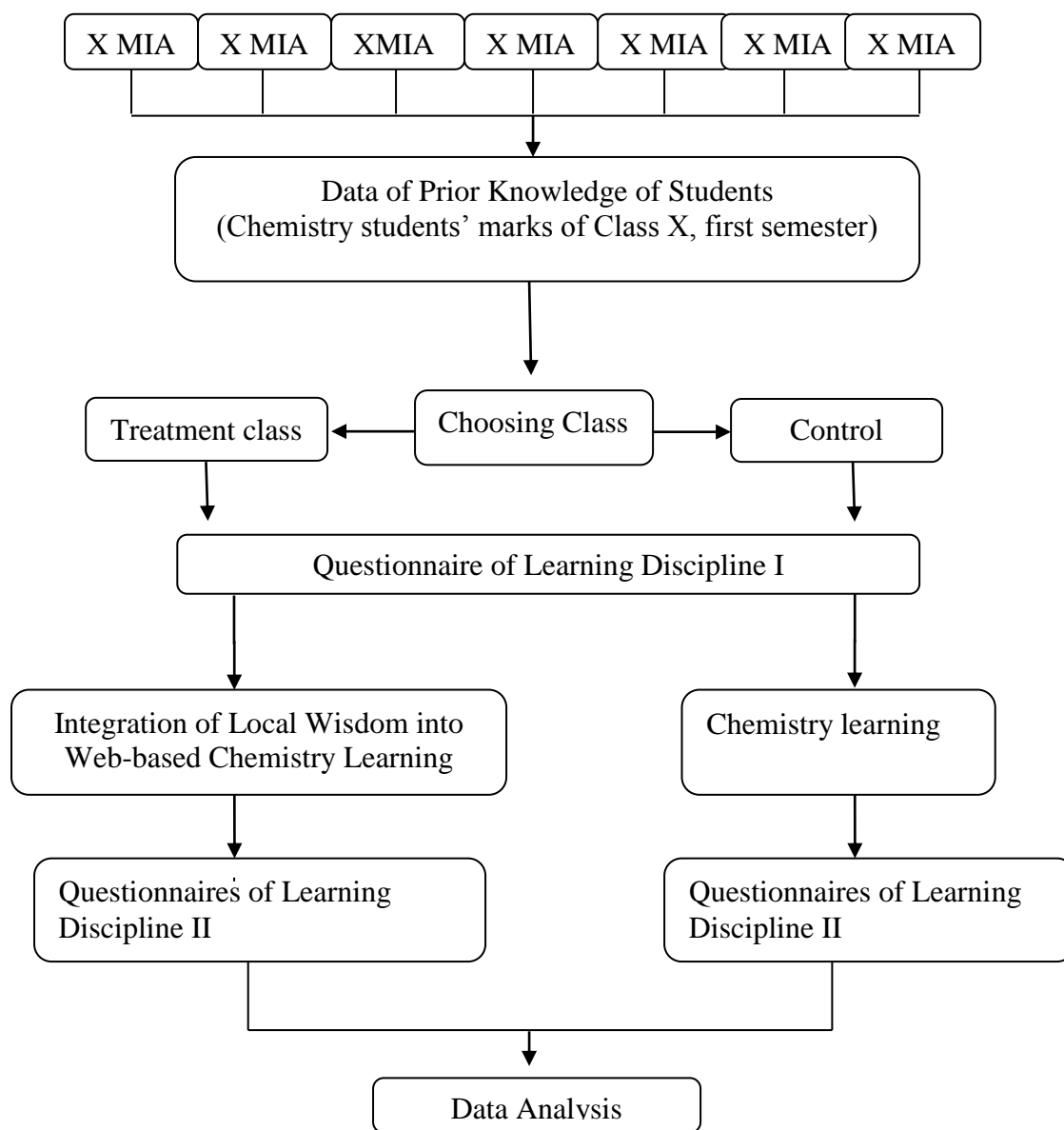


Figure 1. The Diagram of Research Design

## Results and Discussion

Chemistry teaching and learning process in the treatment class (X MIA 5) which integrated local wisdom into web-based chemistry learning was started by having explanation of web-based learning by using edmodo (online class). After that, the students at the treatment class were divided into some groups whose names were the names of places in Purworejo. On the first meeting of the online class, they were asked to have an online discussion via edmodo on

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Chemistry matter of oxidation number. They also had to know the history of the place whose name was used as their group.

The second task was to submit response of online assignment of writing an article through edmodo. The article must be about local wisdom in Purworejo such as electrolyte solution in coconut water, making ionic beverage from mangosteen, having a good time at Jatimalang Beach which related to electrolyte solution, having experiences on a good manner at Museum Tosan Aji, observing limestone purification at Pituruh Sub-district, etc. Discussion of all articles should be focused on chemical reaction, electrolyte - non electrolyte solution, and oxidation - reduction reaction in chemistry point of view.

The third task is turning in assignment about determining oxidation number. All of the tasks given by the teacher had to be turned in on time because all of the assignments were run with certain due date. The due dates were managed strictly to treat students more discipline in learning. Integration of local wisdom in the learning process was to engage students more interested in chemistry. As the consequences, they were expected more discipline in learning chemistry. Online discussion in the web-based learning was also to treat them more interested and more discipline in learning as well.

Chemistry teaching and learning process at the control class, on the other hand, was carried out through the same process as the experiment class except the integration local wisdom into web-based chemistry learning by which the control class was not treated. The teachers had to deliver learning process following the forms of the curriculum, which consists of activities of planning materials and guiding learning in the class (Bruce; 2000). Thus, there were some differences of learning in the treatment and control class but it was still guided by the teacher.

The analysis of data for the hypothesis was to measure the difference of learning discipline of students in two different classes by use of independent sample t-test of SPSS and had the value of significance 0.000. This number was less than 0.05. It meant that there was the significant difference of learning discipline that integrated and those who did not integrate local wisdom into web- based learning (Hinton, Perry Roy; 105) . Figure 2 showed the comparison of student learning discipline at the control and treatment classes.



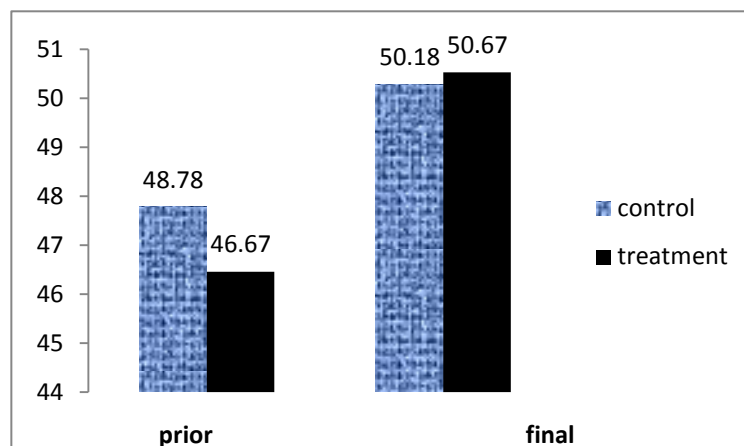


Figure 2. The Comparison of Learning Discipline

The treatment class (the class that integrated local wisdom into web-based chemistry learning) had better learning discipline than control class. It was shown by Figure 2. This fact was affected by students' interest in joining chemistry learning using local wisdom aspect. The discussion related to the interesting materials which made the students attracted and discipline to study.

The problems of globalization provoke the people to search for problems to manage their lives well than before (Mungmachon, 2012: 177). One of the challenges faced by teachers in the education systems is solving problems of moral, cultural, and social degradation which happens in the society because of their depression toward local wisdom. This problem was also faced by Chemistry teachers. As educators, Chemistry teachers should make strong efforts to build students' moral and penetrate valuable cultures and local wisdoms into Chemistry learning. Education practices in the last decade showed that only few schools applying approaches of integrating local wisdoms and cultures into education. Besides that, guidance from teacher supported more discipline was by using a guidance served as an educational program named Edmodo. This was done to make a progress in learning disciplinary. It was proven by the significant value gotten.

During guidance activities, teachers were expected to give some guiding roles while teaching, engage learners more understand, and impart skill and knowledge (Alutu; 2006). In this research, Edmodo was used as medium for delivery system of guidance purposes, and as learning shelves database keeping all documents, sources and media. Edmodo could also be a communication media among the students with record and history. Surprisingly, it would facilitate an international communication among the pupils in relevant communities of registered schools, even across the world. They were able to build friendship, to share learning material, and to

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discuss each other. The use of Information and Communication Technologies (ICTs) could strengthen good teaching strategies that include small teams. The latest study stated that the computer can be a center of teaching environment (Sala; 2006). Sala also added that ICT could form learning environment that strengthened students' active role in learning process.

A good learning process is a learning process making the students understand the learning material well. Students' discipline in learning is really necessary to achieve good learning process. Learning discipline will improve skills and memories of the students because it encourage self-awareness and motivation of students to study. As the consequences, students are expected to be able to solve learning problems well. Tu'u (2004: 48-49) stated that there were four factors that affected discipline, namely: self awareness, loyalty, education, and media.

The data showed that the discipline of students was raised by the use of learning model on Chemistry with integration of local wisdom through online learning. Using the learning model, students felt so interested to study because of some reasons.

## **Conclusion**

The research concluded that there was significant difference of learning discipline between the students that integrated and those who did not integrate local wisdom into web-based learning in chemistry learning at grade ten of State Senior High School 1 Purworejo.

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