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PROCEEDING

*“Fostering Equality in Lesson Study
for Learning Community”*

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WELCOMING SPEECH FROM RECTOR OF UNIVERSITAS PAKUAN

Distinguished President of Association of Lesson Study Indonesia, Mr. Sumar Hendayana, Ph.D.
Distinguished keynote Speakers/invited speakers
Respectable Delegates and Guests
Honorable Presenter and participants
Ladies and Gentlemen...

Welcome to the 9th International Conference on Lesson Study (the 9th ICLS) at Universitas Pakuan Bogor Indonesia. It is organized with the aim of sharing information and discoveries related to research-based lesson study.

Lesson Study is an improved learning quality approach implemented by teachers in a collaborative manner to achieve the learning objectives, to carry out learning, to observe the implementation of the lesson, and to reflect on the learning studied for improvements in the next lesson plan. The main focus of lesson study implementation is student activity in the classroom, assuming that the student activity is related to teacher activity during classroom teaching.

Since Universitas Pakuan got the Grant of Lesson Study from the Ministry of Research, Technology and Higher Education in 2012. Universitas Pakuan consistently implemented the Lesson Study. We have collaborated with many schools in Bogor, and some of them are our piloting school. Currently, two faculties implemented Lesson Study there are Faculty of education and faculty of Mathematics and Natural Sciences.

This conference is expected to provide and share information about the development of lesson study implementation results in each country.

Thank you for your attention, and have a nice conference...

INTRODUCTION

Sumar Hendayana, Ph.D
(Presiden ALSI)

Nine years ago faculty of Mathematics and Science of University of Education of Indonesia (UPI) was initiating the commencement of a conference on Lesson Study for disseminating the best practice of Lesson Study of SISTEMS (Strengthening In-service Teacher Training of Mathematics Education at Secondary Levels) in West Java. The Implementation of Lesson Study was started from one regency in West Java namely Sumedang. Then, it spreads into 16 regencies in West Java. The conference of Lesson Study had been well known as Indonesia Conference on Lesson Study (ICLS). The first through the fifth ICLS was held by Indonesia University of Education supported by the Education Departement of the Government of West Java that involved all teachers in West Java Province. In order to build up the network of lesson study to be wider in the level of national and international, all initiators of lesson study in Indonesia agreed that the 6th ICLS in 2015 and the following years will be held at other universities in Indonesia. Therefore, the 6th ICLS in 2015 was held at Ganesha University of Education in Singaraja Bali. Since the commencement of the 6th ICLS, it was spreaded into the International Conference on Lesson Study (ICLS). In 2016 the 7th ICLS was held at University of Muhammadiyah Malang and Hamzanwadi University held the 6th ICLC in Lombok.

The University of Pakuan will host the 9th ICLS which will be held on 11-13 October 2018. The theme of the conference is **Fostering Equality in Lesson Study for Learning Community**. Attending the 9th ICLS, participants will gain invaluable frontier knowledge about education and pedagogy since the 9th ICLS has confirmed the attendance of the caliber international speakers such as Professor Manabu SATO from Japan, Professor Christine Lee from Singapore, Professor Siripaarn Suwanmonkha from Thailand, Professor Anna Permanasari from Indonesia, and Sumar Hendayana, Ph.D. the president of ALSI. Besides, the 9th ICLS will facilitate the experts of elementary, secondary, and higher education to share their experiences or the results of their innovation especially in learning improvement that is specially developed through lesson study. The special characteristic of ICLS is that during the commencement of the conference, there will be a package of “school visit”. In this session, the participants of the conference will be led to visit the schools that have implemented lesson study. Therefore, the participants will get opportunity to observe the student learning through lesson study which guide the students to learn by utilizing the local materials. I as the president of ALSI cordially invite the policy makers, education stake holders, and education practitioners to participate in the 9th ICLS. The other advantage of taking part in the 9th ICLS is all participants will automatically become the member of the Association of Lesson Study Indonesia (ALSI). I wish the 9th ICLS in University of Pakuan in Bogor can run very well as it is expected.

A FOREWORD OF THE CHAIRPERSON OF THE 9th ICLS

FOSTERING EQUALITY IN LESSON STUDY FOR LEARNING COMMUNITY

Dr. Eri Sarimanah, M.Pd

The Chairperson of the 9th ICLS

Assalamu'alaikum Wr. Wb

A warm welcome extended to the publication of this edited abstract book, an abstract collection of plenary papers and parallel papers under the sponsorship of the 9th International Conference on Lesson Study theme “Fostering Equality in Lesson Study for Learning Community.” ICLS is an annual meeting (henceforth conference) conducted by among scholars and practitioners who are concerned with sound research and solemn discussion in a classroom context where situated in lesson study. Chiefly this context, this annual meeting becomes a mandatory for conducting the 9th ICLS. The 9th ICLS is organized by Universitas Pakuan Bogor in collaboration with Indonesian Association of Lesson Study (henceforth ALSI) and the Ministry of Research, Technology and Higher Education. This conference is conducted on 11th – 13th October 2018.

Throughout this foreword, we would like to express our sincere gratitude due the following invited keynote speakers of this conference; Prof. Manabu Sato, Ph.D (Gakushuin University, Japan), Prof. Christine Lee, Ph.D (Nanyang Institute of Education, NTU Singapore), Prof. Dr. Anna Permanasari, M.Si (Pakuan University, Indonesia), Prof. Assoc Tatsuya Kusakabe, Ph.D (Center for the Study of International Cooperation in Education; CICE, Hiroshima University, Japan), Sumar Hendayana, Ph.D (Indonesia University of Education, Indonesia), Prof Siripaarn Suwanmonkha, Ph.D (Chulalongkorn University, Thailand), , due to their contributors to the 9th ICLS mission. Our sincere appreciation is due to subsequent to the following speakers; Ms. Naomi Takasawa (JICA, Japan), Rie Takahashi (PICO, Thailand), Prof. Yoshida Kazuhiro, Ph.D (Hiroshima University, Japan), Ms. Yamane Tomomi (Hiroshima University, Japan), Prof. Chayapim (Chulalongkorn University, Thailand), Yoko Takimoto (Gakushuin University, Japan), Kanoko Katanayagi (Tokyo University, Japan), Zanaton binti Hj. Iksan, Ph.D (University Kebangsaan Malaysia), Sayyidah (University Kebangsaan Malaysia), Noel Jimbai, Ph.D (Sarawak, Malaysia). Additionally, we would like to express our thanks to the practitioners, researchers, teachers, school principles, and others who are willing to contribute an article to this valuable conference. Their ideas, experiences and recent research findings in the field of teaching and learning process based on lesson study are value-added teacher professional development.

School visit plays an influential role for every Lesson Study conference, so is throughout the 9th ICLS. In the 9th ICLS, four partner schools are applying ‘Do’ cycle for host school visit. The school are namely SDN Kencana 3, SMPN 1 Cigombong, SMPN 3 Cibinong and SMPN 4 Cibinong. Therefore, this school visit remains as one of the main agendas of the 9th ICLS. This school visit is issued of the last day of ICLS. Throughout the school visit, the trained teachers will present best practices to the 9th ICLS participants. It is aimed at providing a completed and fruitful experience for in the implementation of Lesson Study to all participants. Overall this conference covers valuable plenary sessions. Moreover, we conceded around 123 registered papers form Indonesia, Japan, Singapore, Thailand, and Malaysia where presented in parallel sessions. It will be of interest of practitioners and scholars in the teacher professional development domain. We do hope that participants will find this conference vitamin and energy for thought and classroom improvement.

CONFERENCE THEME:

In proudly hosted by Universitas Pakuan
Fostering Equality in Lesson Study for Learning Community

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LESSON STUDY IMPLEMENTATION: COGNITIVE ABILITY, A SKILL TO DRAW AND ARRANGE INSTRUMENTS BY GRADE X STUDENTS IN SUBJECT MATTER OF INTRODUCTION TO CHEMICAL INSTRUMENTS AND MATERIALS IN CHEMISTRY LABORATORY

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Abstract. This research aimed to explore the chemistry teaching learning activity through lesson study approach. This approach is still rarely implemented by teachers nearby of Muhammadiyah University of Semarang. One of them was in SMA N 15 Semarang. We proposed a collaboration program between lecturer and teacher to implement said approach in subject matter of introduction to laboratory instruments. The type of this research is qualitative descriptive research. Three steps in research through lesson study approach were *plan, do, and see*. The subjects of this research were 36 students in grade X. The data collection technique used in this research was test, observation, and documentation. In this research students were expected to acquire some skills, which were skill to recognize chemical instruments and materials; to identify and arrange instruments and materials; to draw the instruments and materials; and to arrange instruments and material in some certain arrangements of lab work. Whereas the concepts that were taught in this teaching learning activity were materials heating, solutions making, and the usage of titration, filtration, and extraction instruments. The early result of this research through observation, we observed that students were not able to use and differentiate simple laboratory instruments yet. In the next step, we could observe that there were significant improvements. The average score for pretest was 67.3 and for posttest was 73.14 with a gain score of 5.8.

Keywords: Chemistry Education, skills, Drawing Instrument, laboratory, Lesson study

INTRODUCTION

This rapidly changing era needs teachers who are creative in directing the teaching learning activity. Teaching learning activity should be arranged and executed well to get better results. One subject in science subject group is chemistry. Chemistry teaching and learning at school should balance the theoretical activity in the classroom and the activity on the field or in the laboratory. The importance of activity in the laboratory is because most of the theories and concepts in chemistry can be proved or tested in the laboratory. The test itself can be verification, proving, or discovery. The importance of laboratory activity, based on Amin by Atika (2017), is how it can improve students' skill in identifying, observing, data collection, and data measuring as well as manipulating instruments for the trial. The success of the laboratory activity is measured by students' ability to use laboratory instruments and understanding their functions.

Based on the benefit of lab work activity, according to the grade X curriculum which was to show scientific behavior (having curiosity, discipline, honest, objective, open, able to differentiate facts and opinions, hardworking, keen, responsible, critic, creative, innovative, democratic, communicative) in arranging and executing trial and discussion which was established in daily life. Therefore, the laboratory activity can ease the students in recognizing, understanding, and constructing the concept of applying and using instruments as base for next laboratory work. The most important thing in lab work activity is to know the instruments and safety requirements in doing research process. Aside from that, introduction to laboratory instruments can be used as a foundation for students in knowing the name and function of said instruments. The instruments really needed to proses in research or laboratory activity especially in chemical laboratory. Knowledge of the instrument and functions of these materials in activities laboratory can minimize errors and reduce hazards.

Laboratory Activity give effect to success student in chemistry learning, Therefore, student directly observe symptoms or chemical processes, practice scientific thinking skills, and instill and develop scientific attitudes. Based on Raharjo (2017) that the type laboratory to student high school type I laboratory. Laboratory type 1 its laboratory basic science to organize education or workshop with facility simple instrument support (complete glassware), and ingredients that is managed is the general category material to serve students' educational activities.

In addition, the lack of laboratory activities in high school results in low knowledge of chemical activities at the University level. That its experienced by basic teknik of laboratory of the lecture chemistry education 2018/2019. Based on Eko Yuliyanto (2018) that skill basic student from senior high school graduation most of them do not know about 75% of laboratory instrument, do not understand the function of 85% and also have never used glass instrument by 90%. The low level of introduction and use of laboratory instrument is also considered dangerous (Budimarwanti, 2018) because the importance of this knowledge must be prepared from the beginning.

Laboratory Activity it's have big role to success in learning chemistry. Besides that the role of the teacher in mentoring the implementation of the activity laboratory is very large. Based on Junaidi (2016) that teacher be main factor in create learning to be effective. So that it takes careful planning and enough time for these activities. The Important of teacher's role in makes the teacher's more motivated in improving the learning process. The process of improvement is always carried out by the teacher in several ways, namely evaluation and reflection. Improvements in learning can be carried out through the lesson study approach.

Lesson study is an activity to improve the quality of learning and teacher professional development. to implement lesson study teacher collaboratively 1) studying the curriculum and formulating learning objectives and the objectives of developing the quality of students, 2) designing learning to achieve goals, 3) implementing and observing a research lesson and, 4) implement reflection to discuss learning that is studied and perfecting it and planning the next learning (Dudley, Pate. 2011; Susilo, dkk. 2011; Madawati,. 2015). In this case the collaboration of teachers from Semarang High School 15 with Lecturers in Chemistry Education carried out the implementation of Lesson study in Chemistry learning in high school. Remember big benefit from lesson study to motivation teachers and lecturers to do that.

Benefit *Lesson study* one of them is improving the quality of teacher learning in learning. In addition lesson study can be source science to skill observing, analyzing, collecting literacy and observation, and documentation skills. The results of observations and also documentation of the data can be used as learning resources for sustainable learning. It is Lesson study can change learning more be effective and efisien to increase sensitivy as observer (Hidayah 2017). Based on Supahar (2010) that the existence of Lesson Study makes the teacher can documenter the progress of his work, the teacher can get feedback from other members, and the teacher can publish and disseminate the final results of *Lesson study*.

Ever step in lesson study can give a rekomendasi to improvement chemistry teaching learning process. So that it can be proposed as a basis for the improvement of the next learning process. Based on result observation the first teacher in teacing the ingredients about the introduction of the instrument only through pictures and by the lecture method. Then a discussion was held which discussed the instrument and ingredients. There are weaknesses in the lecture method and visualization on the ability of students to understand about low instrument and ingredients chemicals. The low level of students 'understanding makes the students' ability to describe and also practice the use of instrument lower. This was also justified by the chemistry teacher at Semarang N 15 High School.

Based on the background description, the researcher tries to combine teacher knowledge with the lecturer so that collaborative research is created. The hope is that with the Lesson Study approach in high school chemistry learning ingrdient The introduction of instrument and ingredient increased understanding and also increased skills. The Skill that student must achieve in this research are the ability to recognize instrument and chemicals ingredients; Identifying, assembling instrument and ingredients, and describing instruments , and arranging ingredients in a series of instrument. While the concept taught in this learning is ingredients Heating; Making Solution; Use of Titration tools; Filtration; and Extraction.

METHOD

Research its using a descriptive quantitative approach that is through quasi-experiments. Research methods using one group pre test post test. Selection pupulation and sample in this research using *purposive sampling* teknik. Sample in this research it students class IPA X 1 in SMA N 15 Semarang semester one subjects chemistry. Divided into 6 group, each groub consists from 6 students. Research held in terpadu laboratory chemistry education muhammadiyah university of semarang. Teaching Material in the form of Introduction to instrument and ingredients chemicals. Step in this research using *lesson study* its *plan do* and *see*. In every step can be explained by :

1. Plan Step

This activity begins with analyzing the previous learning process, namely through the lecturer method. Next set goals, metothods, teaching materials and research strategies as outlined in the Lesson Design and Chapter Design.

2. Do Step

This step lecturer, college student (prospective teacher) and teacher subjects chemistry doing briefing before open class. Next observer from (teacher, prospective teacher, lecturer and waka curriculum). Proses briefing before start activity to open class lesson.

3. See Step

Reflection activities after implementation activities. This activity discuss about result observation activity student and teacher. Beside on result of the reflection obtained a recommendation to next activity in improving learning so that the behavior of students occurs a more positive shift.

The data collection techniques were test, interview, observation, documentation, and portfolio. in test technique, students were given some problems before the teaching learning process. the instruments were twenty multiple choice questions about the identification of chemistry instruments and materials in laboratory. the students' portfolio in drawing chemistry instruments and materials and it's arrangement in an experiment was analyzed using a prearranged scoring rubric.

Data analysis was performed using normalized gain score analysis.

$$g = \frac{\text{score postes} - \text{score pretes}}{\text{score maksimal ideal} - \text{score pretes}}$$

Determination of scoring or N-Gain categories can be categorized as shown in table

1.Tabel 1. categories Scoring N-Gain

Price g	Criteria
$g \geq 0,70$	High
$0,30 \leq g < 0,70$	Medium
$g < 0,30$	Low

(Hake, 1998 in Ni'mah, 2018)

RESULT

The result of this research was students' pretest and posttest score. This data was then analyzed using normalized gain score method. The data is showed in Table 2.

Table 2. Average N-gain Data

Score		N-Gain	Criteria
Average Pretest	Average Posttest		
6,785	73,142	0,179	Low

Based on Table 2, the N-gain was categorized as low. There was no significant improvement in average score in cognitive aspect. Based on the observation data, this was caused by how the students were in a hurry while doing the tests because the teaching learning process was overtime. The students also expressed this fact when they were

interviewed by the college students. Despite that, there were still some increasing score spread. This can be seen in the data on Table 3.

Table 3. Student's N-gain Score Spread Data			
g Value	C riteria	T otal	%
$g \geq 0,70$	High	0	0
$0,30 \leq g < 0,70$	Medium	16	44
$g < 0,30$	Low	20	56

Based on Table 3, it could be seen that there were still some rise in students' cognitive skills. Thus, it could be concluded that there was a difference when the teaching learning strategy was expository and laboratory activity. This not only supported by how the students could interpret the instructions in pictures of instruments and instruments' arrangement but also how they could deliver them in verbal presentation activity. Table 4 showed the interpretation result of identification, pictures, and arrangement of laboratory instruments.

Table 4. The Interpretation Result of Identification, Pictures, and Arrangement of Laboratory Instruments

Subject Activity	Instrum ent Identification	Instrum ent Drawing	Instrume nts' Arrangement Drawing
Material heating	100%	100%	44%
Solution making	50%	80%	-
Titration	100%	100%	44%
instrument usage			
Natural indicator	100%	100%	-
making			
Filtration	100%	85%	40%
Extraction	75%	80%	-
Average	87%	90, 83%	42,7%

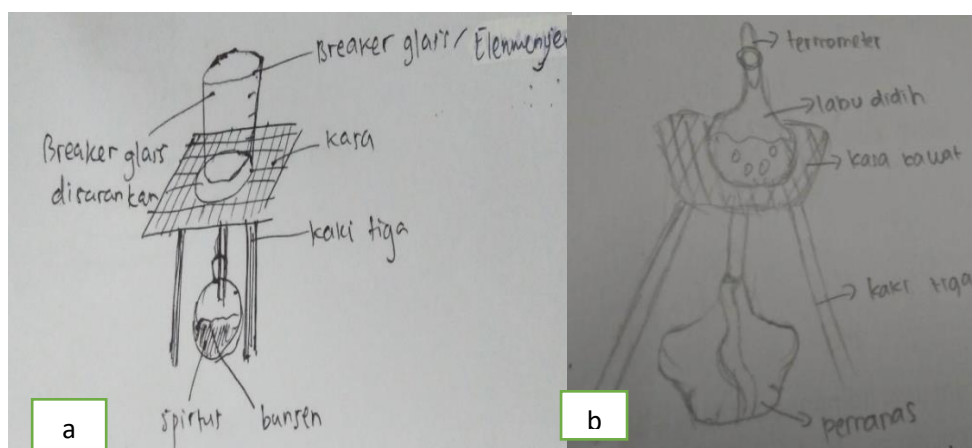
Based on Table 4, the students' ability in identifying chemical instruments were generally good, but not in identifying solution making, which was low. Some students could only mention three instruments in said process, which were watch glass, beaker glass, and volumetric flask. Students' identification results could be divided into six answer groups and showed in table 5.

Table 5. Students' Instrument Identification Result in Solution Making

Group	Instrument Identification in Solution Making
1	Volumetric flask, watch glass, beaker glass
2	Volumetric flask, watch glass, funnel glass
3	Volumetric flask, funnel glass, beaker glass
4	Volumetric flask, beaker glass, funnel glass, volumetric pipette, filler
5	Volumetric flask, watch glass, drop pipette, volumetric pipette, filler
6	Volumetric flask, watch glass, drop pipette, volumetric pipette, filler, scale

The variety of students' answers was a sign that students absorbed the analysis result in different ways. Those differences could be caused by the difference in guidance in teaching learning process. Those answers could be categorized as true, but incomplete and not detailed enough. Those details would help the students to do the experiments, especially in doing quantitative experiment where accuracy is to be expected. For example, in making HCl 1M from HCl stock, the instruments used are volumetric pipette, volumetric flask, filler, spray bottle for aquadest, and drop pipette (Hidayah, 2017). Solution making could be done from solid or liquid base material. The understanding of instruments' functions and solution making's aim should be explained before the teaching and learning process begin. Instrument choosing is very important in laboratory activity. If they the students couldn't interpret the instructions and pick some wrong instruments, there might be some doubt in the made solution. Therefore, it is very important to stress the aim and the necessary instrument for the experiment.

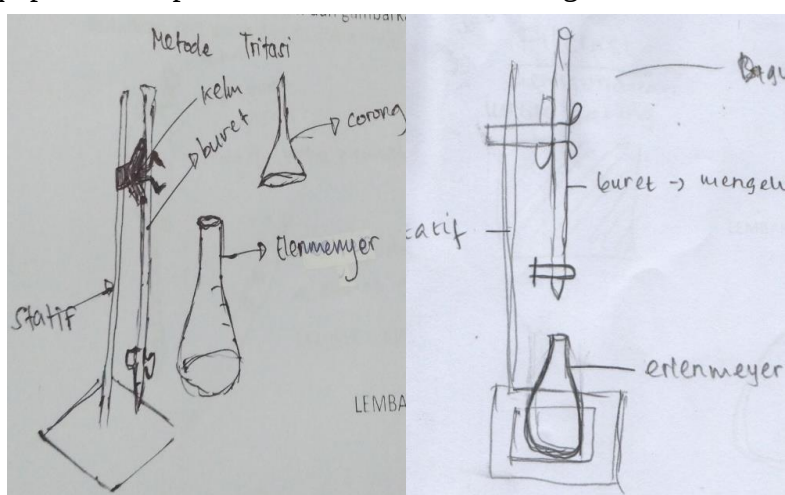
Students often see drawing as a trivial activity. Oemar Hamalik (1986) in Kurniawan (2014) said that drawing is everything that is expressed visually in two-dimension as an outpouring of feelings or thoughts. Whereas based on KBBI, picture is a replica of things, animals, plants, etc. In chemistry lab work, pictures are important tools to communicate the planning and report of said lab work. Pictures on chemistry lab work is used to express ideas and thoughts about instrument's shape, system, process, procedures, diagram, instruments' arrangement, and activity guideline. The existence of the picture can give the students information in a form that is relatively easier to understand. The students had very good capability in drawing as showed in Table 4. They could draw similar to the instrument's real shape. Some of the students' drawing in heating process can be seen in Picture 1.



Picture 1. Drawing of Instruments' Arrangement in Compound Heating Material

The ability to draw a series of tools is very structured and able to be read well so that it can be understood by other students about the work processes and stages in the process of the circuit. The variation of the heating process means that there are differences in functions and objectives in the experiment. In draw (a) only basic heating proses, compound and liquid not volatil can using heating like that. Whereas in figure (b) the heating is using a bath and as a container in the form of boil flask. Boil flask also connected with the condenser or setting the distillation and reflux apparatus. Moreover can be modification with plush thermometer and can be using for thermometer

Component a series of heating processes are in activity laboratory with the experiment. In addition to the draw heating process, a series of tools for titration can be seen in Figure 2. Titration is basic activity in chemistry praktikum. One of its test kualitatif to determine a level compound. Standard equipment in titration using stabs, clamps, burettes, erlenmeyers, glass funnels, and glass beakers. Every instrumen can strung together with pay attention to the location and direction of the scale. accuracy in drawing really needed in this series. In this draw 2 don't shown scale and buret. Scale in erlenmeyer has been shown in this draw. The titration equipment component can be visualized through in draw 2.



Draw 2. Titration instrument series

Generally, students of grade xii ipa 1 had the cognitive and drawing skills, and also capable of arranging lab work instruments. students gave various responds to this chemistry teaching and learning process with lesson study approach. generally, they were glad because it made them feel cared for. it is very important to make a good teaching and learning plan so that the process could be clean and neat. using laboratory as a teaching learning tool helps the students a lot in solving problems and giving real experience.

Response positive given from teacher chemistry subject. Basically the teachers have never used or applied learning lessons in the learning. The teacher explanation of the following lesson study:

“ The impression of using the lesson study approach in general is very good because in learning really everything has been prepared. Activity has been prepare before in advance through the disign lesson. Besides, aspects of the aspects that will be assessed by students are also prepared. In the planning stage: teacher and lecturer discuss to prepare activity has been do. Start from frist activity, core and last activity. prepare also can be do to make instruments assessment. The implementation activities are also very well seen from students who are enthusiastic in carrying out learning, seen from the questions they asked the teacher and assistant, then when asked to draw a chemical tool they already knew. then when asked to draw a chemical instrument they already knew. It turns out that the drawing results are very good and detailed. This impelementation activities closing with presentation from each grub, and it turns out that each group can use it well and look they enjoy and are not burdened. In every each other groub presentation, other grub also give attention very well “

Response Positive not only from teacher subject chemistry, studen but also from student intern, they have an amazing experience. Experience good lesson study very meaningful. Hopefully the teacher candidates can implement it when they return to their respective universities.

CONCLUSION

Lesson study giving a very extraordinary role to the improvement of the learning process. In this study the cognitive abilities of students have not been measured precisely so as to produce a low N-Gain average. But in the interpretation of data drawing, stringing instrument and also identify produce drawing that are able to be digested and read well and systematically. Positive responses presented by lecturers, teachers, students and prospective teachers are evidence of the importance of applying lesson study in educational institutions.

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