



PROCEEDINGS

BECOMING REFLECTIVE EDUCATORS AND PROFESSIONALS OF LEARNING
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International Conference 2014 in Bandung, Indonesia

WALS



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PREFACE

On behalf of the Organizing Committee of World Association of Lesson Studies (WALS) 2014 International Conference, I would like to welcome all participants both local and overseas to the 8th annual conference at Indonesia University of Education in Bandung, Indonesia. The Bandung conference has attracted attention of international community around the globe. There are 782 registered participants from 29 countries with the largest contingent from Indonesia followed by Singapore, Japan, and Sweden.

The theme of WALS 2014 International Conference is **Becoming Reflective Educators and Professionals of Learning**. This theme reflects the continuity of efforts to be reflective educators and professional who never stop learning. Such is represented in the form knowledge, expertise, and other resources which are developed, invested, accumulated, and distributed to improve the quality of teaching and learning.

In this conference, educators and teachers from Africa, America, Asia, Australia and Europe continents come together to share their research and practices on improving the quality of teaching and learning, teacher education and development, school improvement, and learning community through Lesson and Learning Studies.

This proceeding is a collection of papers presented in the WALS 2014 International Conference. It covers 13 strands:

1. Teacher Professional Development
2. Action Research
3. Pedagogies and Teaching Strategies
4. Designing for Learning with Quality in Specific Subjects
5. Research on Lessons in Different Cultures
6. Issues about Leading Lesson Study
7. Learning Communities for School Reform
8. Developing Communities of Practices
9. Creating Knowledge in Practice
10. Student Learning and Development
11. Lesson and Learning Study in Pre-School
12. Lesson and Learning Study in Special Education settings
13. Lesson and Learning Study in Higher Education

We are sure that the papers and discussions from WALS 2014 International Conference will make a major contribution to the national and international dialogue on Lesson/Learning Studies. However, we would like to remind that the views expressed in the papers are those of each author alone and do not necessarily represent those of the organizing institutions or any of their affiliates.

I wish all of us a fruitful conference and opportunities to build networking during the conference. I hope you enjoy the conference and your time at UPI.

Sumar Hendayana, Ph.D.
Chair
Organizing Committee of WALS
2014
International Conference

Welcome Message

On behalf of the Organizing Committee of World Association of Lesson Studies (WALS) 2014 International Conference, I would like to welcome all participants both local and overseas to the 8th annual conference at Indonesia University of Education in Bandung, Indonesia. This Bandung conference has attracted attention of international community around the globe to join WALS 2014 conference in Bandung . We have 782 registered participants from 29 countries with the largest contingent from Indonesia followed by Singapore, Japan, and Sweden. The theme of WALS conference this year is “Becoming Reflective Educators and Professionals of Learning” as we would like to emphasize the how importance it is for teachers and educators to always reflect and learn from their practices in order to improve their professionalism.

This conference program provides you with information about papers, speakers, and venues. Three hundred eighty-six papers will be shared and discussed during the three-day conference. Four papers will be presented by four recognized keynote speakers from United Kingdom, Japan, United States of America, and Indonesia. Ten papers will be shared on two plenary sessions by invited speakers. Participants have many choices to attend concurrent sessions of 372 papers consisting of symposium, workshop, poster, and paper presentations. In addition, the conference offers participants with optional school visits at all levels of education from pre-school to higher-education on November 28, 2014. During the school visit, participants may observe lessons and participate in a post class discussion.

Collaboration and partnership are the spirit of lesson study. WALS 2014 is made possible through the collaboration and partnership with the Directorate General of Higher Education and West Java Provincial Office of Education.

I wish all of us a fruitful conference and opportunities to build networking during four days of the WALS 2014 International Conference. I hope you enjoy the conference and your time at UPI.



Sumar Hendayana, Ph.D.
Chair
Organizing Committee of WALS 2014
International
Conference

It is with great pleasure that I welcome all of you to the World Association of Lesson Studies (WALS) 2014 annual conference in Bandung, Indonesia. WALS is privileged to work together with Indonesia University of Education in organizing this conference and to receive the support from Ministry of Higher Education, Research and Technology, Republic of Indonesia, West Java Provincial Office of Education, the Government of Bandung City, and Japan International Cooperation Agency (JICA). The Indonesia University of Education has been playing an important role in developing and disseminating Lesson Study across Indonesia as well as to other countries in Asia and Africa through technical cooperation with JICA.

The conference organizing team led by Dr. Sumar Hendayana from Indonesia University of Education has worked extremely hard to ensure the success of our annual conference. As of October 2014, the conference has drawn 819 delegates with the largest contingent from Indonesia (375) followed by Singapore (197), Japan (68), Sweden (48), Phillipines (18), Malaysia (16), Thailand (13), United Kingdom (11), China (8), Hong Kong (8) and Brunei (7). For the first time, African countries such as Ethiopia (7), Zambia (7) and Senegal (2), as well as Bangladesh are represented at a WALS annual conference. This outreach to new countries reflects the influence that Indonesia has in these countries as a result of the partnership they have with JICA and Japanese colleagues working in African countries. A total of 28 countries will be represented at WALS 2014 annual meeting in Bandung.

We look forward to the rich conversations among our delegates during the conference on the theme ***Becoming Reflective Educators and Professionals of Learning***. There are **304 papers, 50 posters, 9 workshops, 9 symposiums, 10 plenary sessions and 4 keynotes**. Our annual conferences bring teachers, academics, researchers and policy makers together to discuss lesson study research and practices and to learn from each other's work. We hope to see the development of professional and academic networks through mutual assistance and information exchange among our members at this meeting.

The success of WALS 2014 Bandung meeting is made possible by the dedication of the local organizing team led by WALS Executive Committee and Council Member, Dr. Sumar Hendayana from Indonesia University of Education. We want to thank them for their hard work over the last 2 years to provide an interesting and stimulating conference programme for all participants. We want to thank the Indonesia University of Education for hosting this conference. We are also thankful for the generous support from Ministry of Research, Technology, and Higher Education, Republic of Indonesia, West Java Provincial Office of Education, the Government of Bandung City and Japan International Cooperation Agency (JICA).

I wish all of you a fruitful and engaging time at WALS 2014.



Associate Professor
President,
World Association of Lesson Studies
National Institute of Education,
Nanyang Technological University, Singapore

On behalf of the West Java Provincial Office of Education, we welcome all the participants from Indonesia and overseas. One of the missions of the West Java Provincial Office of Education is improving the access and quality of education. One of the strategies in improving the quality of education is by implementing Lesson Study as a form of teacher continuing professional development through partnership with UPI that has been established since 2006 to develop and disseminate best practices on lesson study in West Java. Beginning with the piloting of lesson study in Sumedang District, lesson study then spread to 16 districts/cities in West Java. Thousands of teachers in West Java have enjoyed the benefits of Lesson Study for the improvement of the quality of education as activities in lesson study have updated their knowledge and skills in facilitating students' learning.

Activities in teacher professional development through lesson study are conducted at school so that the training for teachers becomes more contextual in solving problems at class levels, it does not require high expenses, and it does not cause teachers to abandon their students while participating in the training. Teachers become confident and accountable in teaching students and teaching-learning activities tend to shift from teacher-centered to student-centered while teacher sensitivity toward students experiencing learning problems has increased. In addition, teachers who have been accustomed to lesson study can adapt easily in implementing the Curriculum 2013 because teacher collaboration in analyzing lessons is not something new in lesson study. Teachers have been accustomed to analyzing lessons to stimulate students to think and reason, and build their knowledge so that students understand phenomenon and not to memorize facts.

At WALS 2014 Conference, West Java Provincial Office of Education has facilitated 200 teachers to participate in this conference and half of them present their papers to share their experiences in lesson study. Through this conference, we hope that teachers in West Java will gain more knowledge to even more optimize classroom teaching and learning. Last but not least, we hope that you enjoy the cool atmosphere of Bandung and the conference.



Prof. Dr. H. Moh. Wahyudin Zarkasyi, CPA
Head of West Java Provincial Office of Education

On behalf of the Directorate of Learning and Student Affairs, Ministry of Higher Education, Research and Technology. We wish you the warmest welcome to all participants from various countries. We have facilitated forty-two LPTKs (Educational Institution for Teacher Training) from Aceh to Papua with grants to develop lesson study to improve the quality of learning in higher education since 2009. We collaborate with teaching and learning experts from UPI (Indonesia University of Education), UNY (State University of Yogyakarta), and UM (State University of Malang) to foster LPTKs in the Western, Central, and Eastern regions of Indonesia. The supports in the forms of block grants for three years have been put to good use by LPTKs to focus on the improvement of teaching and learning quality. In addition, LPTKs partner with neighboring schools to develop school-based lesson study in the third year.

Through lesson study, University lecturers collaborate with teachers to plan, implement lesson plans, and reflect the teaching and learning processes. We witness positive changes from the grant recipients such as lecturers have become more accountable and open to criticism in carrying out teaching and learning activities, and have become more confident in teaching students. There is also a paradigm shift in classroom teaching from teacher-centered to learner-centered, and a more harmonious relationship between LPTKs and schools. Results of the development of lesson study in grant-receiving LPTKs will be shared in WALS 2014 Conference. One of the characteristics of WALS 2014 International Conference is the addition of a new strand called Lesson Study in Higher Education Setting.

We hope that participants of WALS 2014 Conference can learn from each other and build international networks in enhancing the quality of education. Please enjoy your stay in Bandung and we hope you enjoy WALS 2014 Conference.



Dr. Ilah Sailah
Director,
Directorate of Learning and Student Affairs
Ministry of Higher Education, Research and Technology

In this very happy occasion, on behalf of the Indonesia University of Education or Universitas Pendidikan Indonesia (UPI), I would like to welcome all the conference participants, both Indonesian and international participants, to our beautiful UPI campus in the city of Bandung. It is quite an honor for the Indonesia University of Education to host the World Association of Lesson Studies International Conference 2014. This conference is made possible through the cooperation between the Indonesia University of Education (UPI), Bandung City Office of Education, West Java Provincial Office of Education, Directorate of Higher Education, World Association of Lesson Studies (WALS), and Japan International Cooperation Agency (JICA). UPI has been the pioneer of the development of *Lesson Study* since 2006 together with JICA through the SISTTEMS Project (Strengthening In-service Teacher Training of Mathematics and Science at Secondary Level) and PELITA (Quality Improvement of SMP/MTs). At the beginning, we assigned 32 FPMIPA lecturers to collaborate with 500 mathematics and science teachers in 94 Junior High Schools to carry out innovation in mathematics and science learning through hands-on, mind-on, daily life by utilizing local materials as teaching materials in Sumedang District, West Java. Training teachers through lesson study puts more emphasizes on empowering teachers collegially than on instructing them to implement models of instruction. In Lesson Study, teachers and university lecturers collaboratively analyze teaching and learning through the cycle of *Plan, Do, See* to improve the quality of teaching and learning. From Sumedang District, we learned valuable lessons from the SISTTEMS Project that, among others, teacher improved their self-confidence and accountability in facilitating student's learning, collaboration between teachers and school leaders improved significantly, teaching and learning shifted from teacher-centered toward student-centered, teachers became more sensitive to and aware of students' learning problems, students were facilitated to learn collaboratively, student achievement gradually improved, and school image in the community improved significantly. Eventhough external supports have already ended, the schools in Sumedang District still continue to implement *Lesson Study* because the community realize the positive impacts of the practice of *Lesson Study*. Learning from the success of the implementation of *Lesson Study* in Sumedang District as a form of teacher professional development, UPI has expanded the target areas for *Lesson Study* in Indonesia. From 2008 to 2010, with the supports from Sampoerna Foundation, UPI trained 1500 teachers of mathematics, science education, Bahasa Indonesia, and English subjects in Karawang District (West Java province), Surabaya City, and Pasuruan District (East Java province). Since 2010, with the supports from the Directorate of Higher Education and the West Java Provincial Office of Education, UPI has trained 7,000 teachers of elementary, junior high, and senior high schools, and headmasters, and supervisors in 10 districts throughout the West Java province. In 2013, through the collaboration with the Government of Jambi Province, UPI trained 5,000 teachers of elementary, junior high, and senior high schools in 10 districts in Jambi province. In addition, UPI has also implemented the practice of *Lesson Study* to improve university courses in pre-service programs. We would like to extend our thanks and appreciation to all parties that have supported the organization of WALS International Conference 2014. Through this conference, let us strengthen our international network to share experiences and learn from each other to improve the quality of education through *Lesson Study*. We wish you all a fruitful and enjoyable WALS International Conference 2014!

Bandung, 24 November 2014



Prof. Dr. Sunaryo Kartadinata, M.Pd.
Rector,
Indonesia University of Education
(Universitas Pendidikan Indonesia)

On behalf of the Government of the Republic of Indonesia, I happily welcome all the participants of the WALS (World Association of Lesson Studies) Conference from various countries. Welcome to Bandung, Indonesia! In this 21st century, we are facing a complex global competition characterized by the rapid development of technology and multicultural society, and therefore education should provide our students with life skills and career skills having characteristics of flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility. To help develop those skills, learning should be carried out in such a way that it can support creativity and innovation, critical thinking and problem solving, communication and collaboration, and information, media and ICT literacy. Therefore, the Government of Indonesia has revised the previous curriculum and developed a new curriculum known by Curriculum 2013 to be implemented comprehensively in 2014. Curriculum 2013 puts emphasis on learning processes because we believe that quality learning processes will result in quality student's achievement too. In learning, students must be facilitated to be able to build knowledge, not to be told. Consequently, the challenge for educators in the primary and secondary levels, and in the university level as well, is to change the paradigm in the classroom from teaching to learning. To implement the new curriculum, we have provided student's book, teacher's book, and we have trained the teachers, principals, and supervisors for one week in all levels of education. The one week training was meant for the socialization of the new curriculum which, afterwards, has to be followed up with continuous lesson studies.

Lesson study is a strategy to improve the quality of teaching and learning through studying the teaching and learning processes continuously by empowering teacher's potentials collaboratively and collegially. Lesson study emphasizes student-centered learning and trains high order thinking skills through daily life approach as well as utilizing local materials. Lesson study also functions as a continuous professional development. Lesson study activities are usually carried out at school so that these activities are relevant and are based on real classroom activities. The Government appreciates all the teachers who have implemented lesson study and we hope that the implementation of lesson study will improve the quality of classroom teaching and learning, and it ultimately will improve the quality of education in the country.

Lesson Study has been introduced in Indonesia since 2006 through the technical cooperation under the support from JICA. Although the supports from JICA ended in 2011, the practice of lesson study did not stop. Lesson study continued in various regions supported by regional government and universities. However, lesson study activities still need to be improved so that lesson study can affect the improvement of the quality of education in Indonesia. WALS 2014 conference organized by UPI has to be used well as a forum for learning from each other and for network building among educators from all over the world.

Last but not least, we would like to thank World Association of Lesson Studies (WALS) and UPI for organizing WALS 2014 conference. We hope that all participants of WALS 2014 conference will obtain invaluable lessons to improve the quality of education their own country.

We wish you a fruitful and enjoyable conference!



Prof. Dr., Muhammad Nasir, Ph.D
Minister of Higher Education, Research and
Technology

Implementation of Lesson Study with Combination of PAKEM and LOVE to Improve Students' Activeness

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Abstract: Learning quality improvement has been the main concern of lecturers in Biology Education Department, Faculty of Teacher Training and Education, Universitas Ahmad Dahlan. In order to implement the suitable learning strategy in the class, students' problem in learning must be appropriately recognized. The root problem identified in the animal physiology I course was the students' activeness during learning process. Lesson Study activity was conducted with the implementation of PAKEM (*Pembelajaran Aktif, Kreatif, Efektif dan Menyenangkan*/Active, Creative, Effective and Fun Learning) model. This approach combined with the LOVE (*Lembar Observasi Video*/Video Observation Sheet) aimed to increase students' activeness in learning as well as stimulating their independence in learning process. Using LOVE, students were encouraged to extract information related to the topic independently. Through lesson study activity, lecturers belong to the same subject worked collaboratively based on collegiality and mutual learning in order to create learning community, which was implemented in three main activities, i.e. plan, do and see. Subject in this activity was 48 students joining animal physiology I course, with a lecturer as a model and 9 observers. Four cycles was conducted in this activity during March-April, academic year 2012/2013. Data analysis and discussion from all four cycles in lesson study showed that PAKEM approach combined with LOVE improved the students' activeness in class.

Keywords: learning activeness, PAKEM, LOVE, Lesson Study

1 INTRODUCTION

One of the important things in our educational system is to improve the learning quality which plays significant role in determine the quality of education. Department of Biology Education, Faculty of Teacher Training and Education, Ahmad Dahlan University is an institution which has responsibilities and strong commitments to create professional biology teachers in order to face such challenges in the future, e.g. globally rapid development of biological science and changes in the educational system. Curriculum evaluation and learning innovation are needed to face such challenges, thus the institution (Department of Biology Education, Universitas Ahmad Dahlan) has made some efforts and one of them is a Lesson Study. Lesson Study is a momentum for lecturer to collegially improve the quality of learning.

One of the problems faced by students in learning the Animal physiology I course was the difficulty in writing and oral expression on the subject. Students tended to be passive during

learning and inquire everything only from their lecturer. PAKEM (*Pembelajaran aktif, Kreatif, Efektif, dan Menyenangkan*/Active, Creative, Effective and Fun Learning) is a learning approach that encourages students to do some activities and develop their skills, attitudes, and comprehension, so that learning becomes more interesting, fun, and effective (Sudrajat, 2012). Active learning is a process that involves all of students to search some information and find out ideas to answer questions given by their lecturers (Ernst and Colthorpe, 2008). In the PAKEM model, learners are encouraged to actively and creatively learn and find out ideas to solve the problem.

The effectiveness of PAKEM implementation in biology learning as previously reported by Udovic et al. (2002) that isto develop students' understanding on concepts related to biological science and improve scientific observational skill of students. This means PAKEM model applied in the class would be effective in solving the students' learning independence as well as students' motivation to learn.



2 METHODS

Lesson study activity was carried out on Animal Physiology 1 course, in class B consisting of 48 students, academic year 2012/2013. People that were involved in this activity were a model lecturer and 8 observers.

This activity of lesson study consisted of four (4) cycles and carried out from March 11, 2013 to April 3 2013. Plan, do and see were carried out in every cycle. In plan, all of activities (including preparation of observation sheets, student work sheets) during the lesson study were designed, and identified. In do, a model lecturer taught according to the plan and observers observed the learning. In see, all of activities during lesson study were evaluated.

Data obtained through the observation sheets were evaluated quantitatively and qualitatively.

3 RESULTS AND DISCUSSION

Table 1. showed lecturers who served as observers used observation checklist to monitor students learning activities. Monitoring was carried out at each cycle during implementation of LS. In order to produce objective data, observers were divided to observe certain groups according to the number of student groups. There was four students groups. The results of these observations was further used as the data to see an increase in the activity of learning-related oral and writing activities that took place during the lesson.

Table 1. Increase in the activity learning at the course of animal physiology 1

No	Aspects of the learning activities	Increase		
		Cycle 1-2	Cycle 2-3	Cycle 3-4
A Oral Activities				
	1. Learning develops inquiry concept	8,37	12,71	14,46
	2. Asking	14,45	10,45	7,83
	3. Involved and participate in the learning process	1,93	14,11	12,02
	4. Find and communicate ideas	14,8	30,48	2,44
	5. Asking the idea	10,6	10,29	4,19
B Writing Activities				
	Writing and make resume (illustration, concept maps)	14,45	14,45	14,45

The data were then analyzed descriptively to determine whether there was an increase in the students' activity of learning on various aspects of PAKEM indicators. The results of the descriptive analysis are shown in table 1.

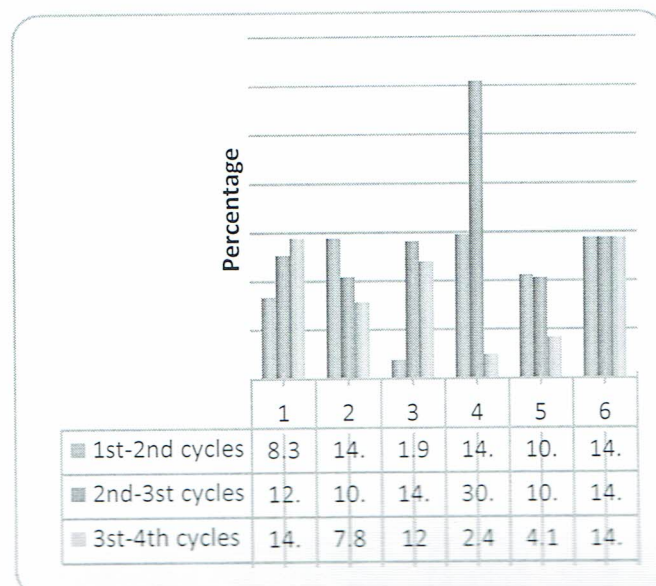


Figure 1. Learning activeness during the lesson study activities.

From Table 1 and Figure 1 above showed an increase of each cycle in the learning activities of both oral activities and writing activities. Aspects of oral activity was seen from five aspects 1) Learning develop inquiry concept increased from the first cycle to the second cycle of 8.37%, and the second cycle to third cycle was 12.71%, and the third to the fourth cycle was 14.4%. 2) Asking aspect increased from cycle 1 to cycle II of 14.45%, and the second cycle to third cycle 10.45%, and the third cycle to the fourth cycle at 7.83%. 3) Engage and participate in the learning gained from the increase in the first cycle of 1.93% to the second, the third to the second cycle of 14.11%, and cycle III to IV was 12.02%, 4) students find and convey the ideas derived from the increase in cycle I to II by 1.80%, the second cycle of 30.48% to third, third to fourth cycle of 2.44%, and 5) Asking the idea, from the first cycle to the second 10.60%, the second to the third cycle of 10.29% and Cycle III to IV was 4.19%. In writing activity with indicators of students in terms of the writing and making of summaries (pictures, map concept) was not increased.

At the meeting of the first cycle in lesson study activities, students are grouped based on the presence number. Students made per group with a

different number of members. Students are grouped heterogeneously (one group consist of intelligent, moderate and less intelligent students) in order to obtain the 4 groups. The findings based on observations, there were three groups that did not want to cooperate with others. They chose to work on their own and they only waited for a response from the group. Interaction with lecturer was still lacking, students were not confident to ask lecturer when he was around the students. Although the model is trying to stimulate questions, there were not many students willing to ask. Some students have asked related to the lesson topic. But the biggest question is about what they should do on the students' worksheet. This indicates that the students still did not really understand or were not accustomed to PAKEM which enabled students themselves to find a concept and or idea of the topic that was being studied.

Other findings were also obtained in the first cycle that some students were reluctant to express their opinions orally and to present in the class even if the student could work on a given student worksheet. When the lecturer asked, many students were silent or tried to appoint his friend to reply. This indicates that students were not accustomed to express their opinions even though they could work on the worksheet or understand the materials. Based on the findings in the first activity, the formation of students' groups from different batch were not suitable to obtained good teamwork. For the second meeting in LS activity, students of different batch are grouped separately. In order to strengthen interactions within a group, it would be helpful if students get together with close friends.

From observation of LS activity in the second cycle, the results obtained are better than previous cycle. There was an increase in the activity and interactions among students. In the second cycle the students started to confidence in asking the lecturer. Students seemed to feel comfortable with the model group in the class and they seem to understand what to do in each of the groups during the learning process. However, interaction between students and lecturers were not seen to be improved. Several times lecturers visited each group and explained the material, some students who were just started to ask about the materials.

LS activities for all three cycles carried out in accordance with the results of the plan session prior to the third cycle. The grouping system at second cycle turned out to give better results so that grouping students according to the batch were still implemented. The findings in third cycle was an active student group was a group of 4th semester students, or students who are currently taking animal physiology 1 course. The group of senior students

(group 1) or repeater students seemed to be not very active. If the lecturer models approached and asked to group 1, only a few students responded, while the other was silence. Another finding that appears on the third cycle is a student presentation to the class was uneven, which was dominated by the same student. There was a tendency to refer to his students the same which they consider more able to communicate the results of their group work to the class. However, in the third cycle, the student activity appeared to increase compared to the previous cycle. Students also listened to an explanation of their friends who were presenting in front of the class while making a summary or notes about the topic. Students also seemed to enjoy the class dynamics as a result of PAKEM implementation. Therefore, in the third cycle in accordance with the results shown in Table 1 that the indicator is active, creative, effective and fun improved compared to the previous cycle. Thus, the problem appears to student learning independence can be fixed using PAKEM in class.

From some of the findings observed in the third cycle, for the fourth cycle activity (last) in accordance with the plan which has been agreed lecturer clumps, namely: (1) the exchange of seating for groups that initially less active (group I) and located next to the front moved forward to the middle position. This is done with the expectation students more active and easily monitored by lecturer models, (2). Opportunity for presentation explaining the concept to the class is not offered to all groups, but only to appointed group. The strategy implemented was choosing group that are usually active given the last chance for presentation. Other treatment conducted was giving additional score for groups and individuals who are active during the lesson. Students seemed more enthusiastic due to the additional score offered by lecturers models if they are active and show the courage to explain the concept of the material. The students' activeness in this fourth cycle already improved than previous cycles. Students' enthusiasm to follow the learning was increasing, the interaction between students and between students and lecturer was more increased, although still was not optimal. The activeness level of students in aspects of working together, engage and participate in learning activities showed an increase which is much better than the previous cycle. Students also appeared to be active in making a summary of the material, especially from a presentation delivered by their own friends. When there was something less obvious, students also confirm to their friends and to the lecturer models. For the last cycle, the achievement of expected competences in animal physiology courses first seen to rise. This is reflected in the student's ability to

answer questions orally and lecturer models of a given student worksheet. Another aspect that also increased was the fun learning, where students feel comfortable with the conditions in the classroom. Overall observations of the last cycle were discussed together in lecturers' reflection session. Various input and suggestions were documented so that it becomes a reference for improving the quality of learning in the biology education department.

The results obtained in lesson study activities for animal physiology course 1 for class B 4th semester students in academic year 2012/2013 was broadly in line with the results of previous LS research activities in biology education department. Students independent learning which were low on animal physiology 1 course 1 in the past, seemed to be overcome by the application of PAKEM model in the classroom. Widyaningrum et al (2012) reported the increase in test scores and the percentage of students passing grade on basic biology courses 2 using jigsaw model in LS activity. Another explanation was also described by Aprilia et al. (2012) that an increase in the activity of the students in the learning process is achieved through LS. The process of reflection among lecturers, was valuable in solving any problems that occur during the learning process in the class. Observations become very valuable input on how students respond to learning.

As stated also by Lenski and Caskey (2009) that LS activity is helpful to develop lecturer professionalism in planning and learning. In LS, teachers / educators construct, organize, share and sharpen their knowledge in learning. Therefore, the process of plan, do and see during LS activities should get full attention so that problems can be solved effectively, in addition, students can also achieve competences expected of a course. For group of lecturers themselves, LS activity patterns can be used as a positive culture for professional development and quality improvement of teachers.

4 CONCLUSIONS

Implementation of Lesson Study in animal physiology 1 course improved learning quality with PAKEM. Students have increased their activeness and creativity, as well as fun learning aspects. The effectiveness of learning was also increase with the achievement of the expected learning competences. Students' independence learning problems can thus be overcome through the implementation of PAKEM in class. Collaboration of lecturer to implement plan, do and see activities was also the key success of LS in order to solve learning

problems experienced by students. For the lecturer, lesson study was an effective tool to improve the professionalism as an educator. It was suggested to implement lesson study continuously as a positive culture for lecturers. PAKEM model in learning process was also recommended to improve students' learning independence.

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