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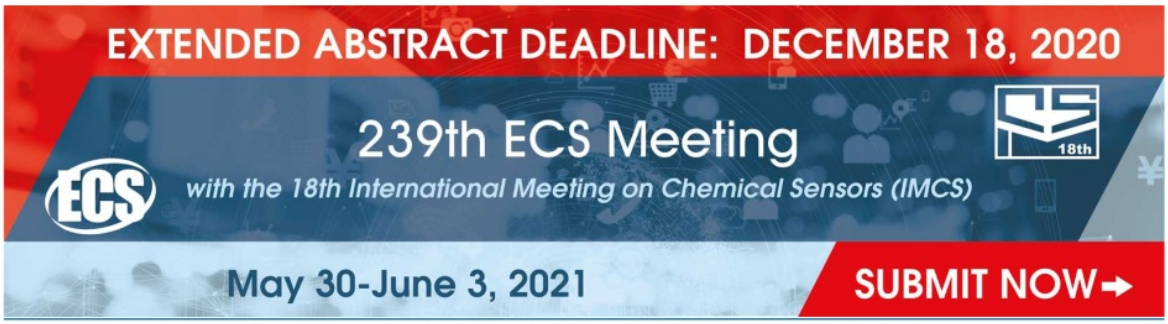

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Improving the quality of learning in science through optimization of lesson study for learning community

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Abstract. Lesson Study for Learning Community is one of lecturer profession building system through collaborative and continuous learning study based on the principles of openness, collegiality, and mutual learning to build learning community in order to form professional learning community. To achieve the above, we need a strategy and learning method with specific subscription technique.. This paper provides a description of how the quality of learning in the field of science can be improved by implementing strategies and methods accordingly, namely by applying lesson study for learning community optimally. Initially this research was focused on the study of instructional techniques. Learning method used is learning model Contextual teaching and Learning (CTL) and model of Problem Based Learning (PBL). The results showed that there was a significant increase in competence, attitudes, and psychomotor in the four study programs that were modelled. Therefore, it can be concluded that the implementation of learning strategies in Lesson study for Learning Community is needed to be used to improve the competence, attitude and psychomotor of science students.

1. Background and Purpose of the Research

Learning design is a way to plan a system of learning environment after previously first set learning strategies. Learning strategy is a strategy or technique that must be owned by the lecturers. It is very necessary because it will greatly determine the quality or properness of learning done by a lecturer, because the learning process requires knowledge, art, and expertise in delivering materials to students according to goals, efficient, and effectiveness.

Lecturers as professional educators must have idealism and high fighting spirit, as well as professional performance, especially in designing the teaching program and implementation of the learning process. Miriam Zukas emphasizes pedagogic meaning for lecturers very important, because lecturers can be viewed from three angles: teacher as charismatic subject, teacher as component craftperson, and teacher as reflective practitioner [1].

Perrenoud in Bipoupout Jean Calvin states that pedagogical competence involves the mastery of educators, in learning planning and evaluation, presentation skills (knowledge of learning materials), technical skills, managerial skills, and communication skills for evaluation [2]. During this time, in the implementation of learning for FMIPA students there are still many obstacles. This is evident from the results of surveys and monitoring conducted by the Institute for Development and Increased Instructional Activities (LP2AI) on the learning process. In the pedagogic aspect, the frequency of negative perception is still high with the grading of the ability to enliven the classroom (12%), the use of media and learning technology 10.3%, and clarity in the material and answer to the questions in class (7.5%). In the aspect of student involvement competence in research and/or study/ engineering/design (11%), and clarity and use of communication technology explain the subject (16,8%).

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To achieve the quality of learning as well as mentioned above, a strategy that includes plan, method, or series of activities is designed to accomplish a particular education goal. Lecturer as a communicator must have a high psychomotor so that students get optimal results in learning and can encourage students to be able to find their own ideas. Improving the empowerment of lecturers through lesson study according to Zaki Malik and Athman Bouguettaya is one of the strategies to create more innovative lecturers for high quality to gain competitive advantage [3].

Therefore, based on the description as mentioned above, it is necessary to establish a strategy that can overcome the optimal learning and one of them is through the implementation of Lesson study for community in FMIPA.

2. Research Method

The research method used in this research is action research method through improvement or improvement of quality, either micro or macro. Collection is done by observation, test, field record, and documentation. Data analysis techniques performed with data reduction, data presentation, and conclusion. The process of data selection which is data reduction is obtained from the subject matter and field notes, while the collection of information as the presentation of data and then done the conclusion of data based on the results of reduction and presentation of data.

The research was conducted for two semesters, namely: even semester 2016/2017 and odd semester 2017/2018 on Biology, Chemistry, Computer Science and Pharmacy. The research stage consists of three cycles and the observation sheet consists of the stages of planning (Plan), implementation (Do), and reflection (See). As the object of research is the student. Parameters observed were student learning activities, collaboration and communication among students during the learning process took place. The reflection was performed based on the use of lesson study model based on CTL and PBL in the classroom at the end of the cycle and conducted through three cycles.

3. Result and Discussion

Lawrence Ingvarson quotes Fenstermacher and Richardson in Linda E. Martin et al that there are two distinctions between good teachers and successful teaching [4], as follows:

> *"By good teaching we mean that the content taught accords with disciplinary standards of adequacy and completeness, and that the methods employed are age appropriate, morally defensible, and undertaken with the intention of enhancing the leaner's competence with respect to the content studied. By successful teaching we mean that the learner actually acquires, to some reasonable and acceptable level of proficiency, what the teacher is engaged in teaching".*

The implementation of collaborative, communicative, and innovative learning models is the theme of this research. Preparation of chapter design and lesson designed is done for open class preparation and data retrieval is done in 3 cycles. Implementation of Cycle I Action is designed in accordance with the concept and strategy that has been planned from the beginning. The relationship diagram of approaches, strategies, methods, and instructional techniques are presented in figure 1 below.

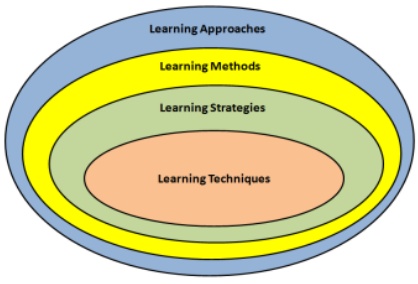

Figure 1. Relationship between approaches, strategies, methods, and learning techniques

The stages plan in cycle 2 and cycle 3 are implemented based on the recommendations of the reflection of cycle 1. The learning outcomes are observed through the five different capacities/capabilities achieved, which include intellectual skills, verbal information, cognitive models, attitudes, and motor skills. Election of course is done by choosing the relevant subject has previous learner prerequisite so that will facilitate us in observation of competency, affective, and psychomotor aspect of student. Observations made by observers at cycles 1, 2, and 3 and through two even and odd semesters obtained the results of student enthusiasm on task and vice versa off task as shown in Figure 2.

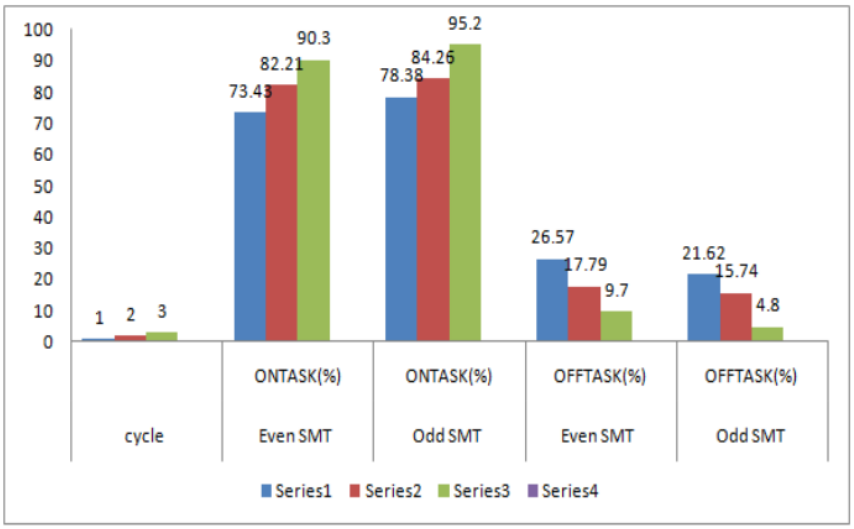

Figure 2. Students' enthusiasm in cycles 1, 2, and 3 even and odd semesters

Based on the table and graph of learning enthusiasm data during the learning process on cycles 1, 2 and 3 of the even semester increased on-task from 73.43% to 82.21% and on the third cycle 90.30% and in the odd semester on -task seen with the first cycle has begun an increase compared to the even semester that is in the first cycle 78.38%, the second cycle 84.26% and the third cycle also seen there is a significant change that is equal to 95.20%. The data indicate that there is an increase in learning enthusiasm in even and odd semester averaged for two semesters in example for one-on-task cycle of 7.33% and on the second and third cycles of 9.55%. This means that from cycle one to cycle 3 has a significant increase of 16.85%, while the off-task of two semesters on average decreased from cycle one to cycle two of 7.23%, then from cycle 2 to cycle 3 9.56%. It shows that from cycle one to cycle three has decreased significantly, that is equal to 16.85%. For example, from Computer Introduction study, based on cognitive test at the end of cycles 1, 2, and 3 there are 7 students or about 21%, 6 students or 18%, and in cycle 3 there are 3 students or about 10% did not reach the Minimum Exhaustiveness Criteria score (KKM75), while 29 students or about 91% of students had reached KKM.

Steps in the application of CTL and PBL contained in it initiation stage and acquired, students are divided into groups. Furthermore, in the elaboration stage students are given the task to be done in groups and discussions. It is realized in the form of concept explanation. Affective learning is one of the variables that must be improved in the implementation of Lesson Study for Learning Community in FMIPA. Students who have interest in learning and a number of attitudes will feel happy even challenged to study certain courses so that will gain higher success.

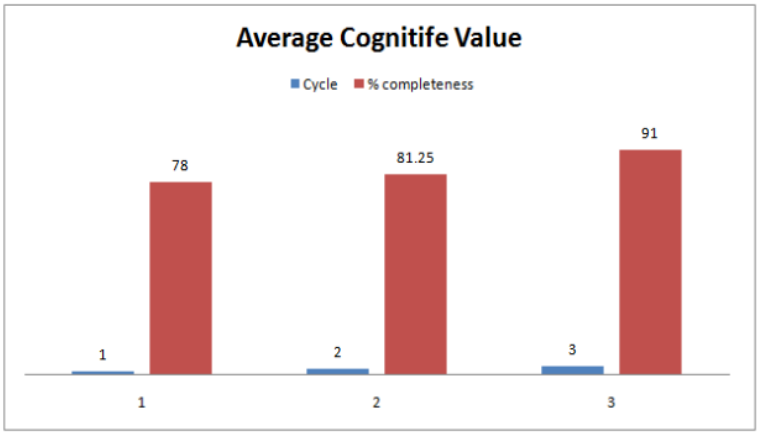

Figure 3. Completion of Student Cognitive Value from Cycles 1, 2, and 3

David R. Krathwohl stated that "In the original Taxonomy, the Knowledge category embodied both noun and verb aspects [5]. The noun or subject matter aspect was specified in Knowledge's extensive subcategories. The verb aspect was included in the definition given to Knowledge in that the student was expected to be able to recall or recognize knowledge". Results of affective learning or student attitudes toward the course of Software Engineering from cycle 1 to cycle 2 and then to cycle 3 can be seen in Figure 4.

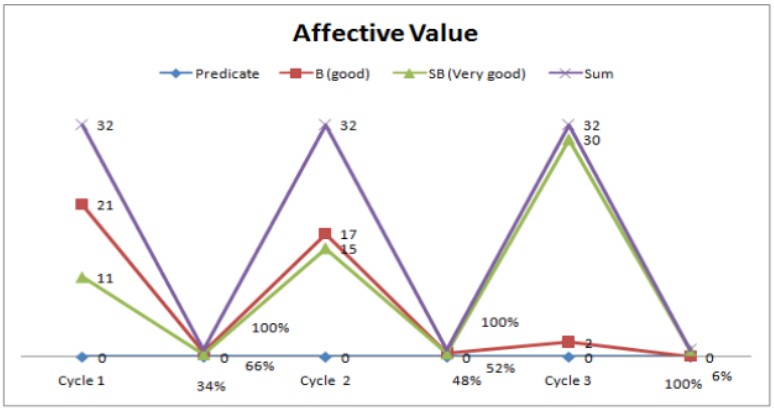

Figure 4. Affective values of students

Application of Lesson Study method based on Contextual Teaching and Learning and Problem Based Learning can improve students' skill in discussion. The visualization can be seen in Figure 5. The average value of students per psychomotor indicator of cycles 1, 2, and 3 in two semesters in Software Engineering courses can be seen in Figure 5.

4. Conclusion

The results showed that there was a significant increase in competence, attitudes and psychomotor from research conducted on four study programs. The success criteria in each step on the benchmark of KKM

achievement with the value of more than 75 and the classical reach 80% of students has reached the value of more than 75.

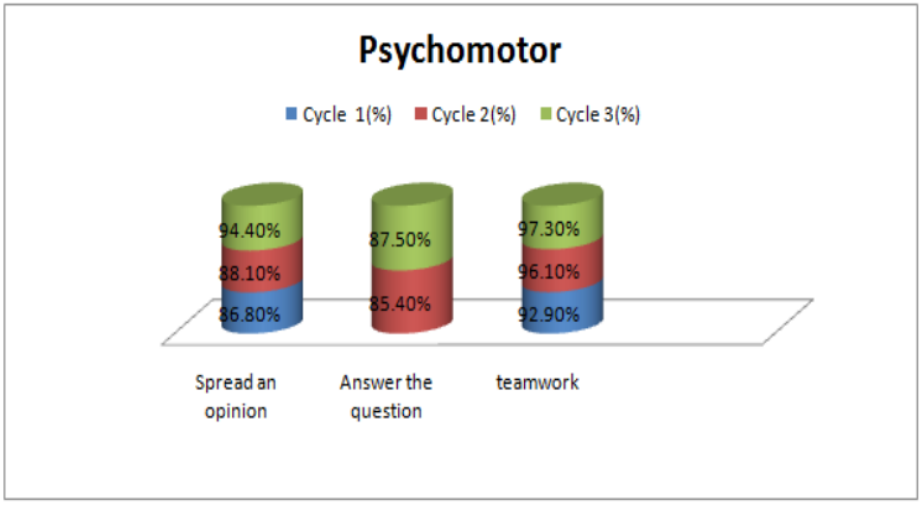

Figure 5. Average student scores per psychomotor indicators cycles 1, 2, and 3

Guidelines for classical assessment of attitudes of the average score of 80 and psychomotor complete up to 19-25 (very good). In the four average programs per aspect of attitude assessment in the cycle that includes the aspects of receiving, responding, valuing, organization and characterization by value set indicate that there is a significant increase so that the strategy of CTL and PBL is the right strategy for the sphere of attitude.

Enthusiastic increase in the third cycle on-task 92.75%, while off-task 7.25%. It can be concluded that the implementation of learning strategy in Lesson study for Learning Community can be used to improve the competence, affectivity, and psychomotor of students in the field of science.

The quality of learning innovation, the development of learning communities between the lecturers and between students showed an increase in student enthusiasm in the third cycle on-task of 92.75%, while off-ask decreased by 7.25%. Therefore, it can be concluded that the learning model of Lesson Study based on CTL and PBL is good enough as an innovative learning model that is suitable with the condition and situation in FMIPA. Thus it can be concluded that the method of Lesson Study for Learning Community is an appropriate and effective learning strategy to improve the quality of learning in the field of Science, especially in Pakuan University FMIPA.

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