



## The Training for Designing Inquiry Learning Tools for Teachers of Science and Social Science in Pontianak

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Inquiry, Learning Tools, Science,  
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**ABSTRACT**

*This study was motivated by the lack of knowledge and skills of junior high school students in the city of Pontianak to design learning tools, in the form of lesson plans, student worksheets, assessments, and KIT media in science and social studies learning. The method used is the implementation of in-service in the form of training and mentoring in the development of inquiry learning tools using MGMP (teacher discussion activity)-based lesson study strategies. The results of the activity showed that the IbM program designed the inquiry learning tool for teachers who were members of the Science MGMP and the Social Sciences MGMP had achieved the expected goals, namely increasing the knowledge and skills of science and social studies teachers in designing inquiry learning tools. It is shown from the acquisition of the results of the response questionnaire and the output of the activities produced.*

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## INTRODUCTION

Skills in finding out about nature systematically or acting can be referred to as an inquiry process skill or inquiry skill (BSNP, 2006). The inquiry is a series of activities involving basic skills and other complexities (NRC, 1996). Inquiry uses systematic and logical steps in the problem-solving process in science, while social inquiry emphasizes the experience of students to solve social problems (Isjoni, 2007). The implementation of inquiry in science and social studies learning in junior high schools experiences problems. According to Wilke & Straits (2005), traditional teaching and learning strategies are generally still used by teachers and lecturers, because they consider my knowledge to be a learning strategy that is difficult to implement. The teachers were identified from the results of a meeting with science teachers of Junior High School 20 as well as the head of MGMP of IPA (Science) and Social Science (IPS) teachers at SMP 26 and also the head of MGMP IPS in Pontianak in February 2015. During this time junior high school teachers who joined MGMP IPA and MGMP IPS experienced a problem in guiding students to find concepts and active roles in learning. In the practice of classroom learning, the teacher only gives information without guiding students to find the concepts learned. Students difficulties in science and social studies because the concepts studied tend to be only memorized without prior understanding. The average science and social studies learning outcomes are below the Minimum Examination Criteria (KKM), which is 60

for the Natural Sciences and 65 subjects for the Social Sciences in Pontianak City Junior High Schools.

According to the MGMP IPA (partner 1), socialization about inquiry in science learning was obtained by the Pontianak city teachers. These activities are only the design of the lesson plan, not including worksheets, learning media, assessments, and class learning practices. Learning media such as modules equipped with authentic inquiry-based assessment can improve students' inquiry skills and thinking skills (Hairida, 2016). All MGMP IPA have guided the MGMP activities in designing inquiry lesson plan but experienced the lags when designing student worksheet and their assessments. In addition, science teachers who are members of the Pontianak MGMP, have difficulty in making delivery of the preparations to help in teaching concepts to science students, at a time when school availability is very poor. The problems have been discussed throughout the MGMP with supervisors, but there has been no follow-up, so the science teachers in Pontianak City are less motivated to develop their classroom learning.

Another problem is the social studies subject, according to the parents of the MGMP (partners2) junior high school teachers who joined the Social Sciences MPG (24 teachers) IPS complained that the IPS studies were less interesting. : 1) the teacher explained, they did not do much activity in learning, only they read, 2) social studies learning was boring because of a lot of memorization, 3) learning social studies could be alone because desert reads alcoholic drinks. The results of the IPS study were found to be as much as 85% obtaining scores under the KKM IPS, namely 65. Hope from students among others: 1) there are changes in learning, 2) learning activities vary, 3) students are involved in learning. Questionnaire results and tests show that students want to engage in learning, but teachers do not involve them in learning. The results of discussions with parents of MPMP IPS were informed that social studies teachers at SMPkota Pontianak did not understand how to develop learning tools to train scientific work in learning. Learning with inquiry models can increase student activity because students are involved in analyzing problems and finding answers to problems faced. There was a desire by the social studies teacher to develop such learning, but the social studies teachers who joined the MPMP IPS could not develop the learning tools, namely: lesson plans, student worksheets, assessments, and learning materials that were by the material being taught. This inquiry has been tested effectively in increasing critical thinking in student scientific work (Liliasari, 2009), increasing student learning achievement (Khan and Iqbal, 2011).

The survey of learning carried out by Social Sciences and Science teachers at Pontianak 12 Public Junior High School in March 2015 identified several findings, namely: teachers gave more information than guided students to find concepts, learning media did not exist, other than the blackboard. When the teacher delivers the material, only 1-2 times ask the students, and the activity of approximately 80% of students is just silent and notes when the teacher explains the material, then students are assigned to work on the student worksheet in the form of questions and collected. The survey results also show that the learning carried out by teachers is based on electronic school books (BSE) and textbooks and student worksheet from publishers. According to Darliana (2013), the SMP Science book still has weaknesses, for example the contents of the book are still dominated by knowledge that must be memorized by students, the questions in the book have answers in the material described, activities in the student worksheet that must be done students in solving problems have been led to follow an algorithm and only fill in the points in the statement sentence. Based on the explanation above, the IbM program for designing inquiry learning tools is very urgent to be carried out in the Science MGMP and Social Science activities in Pontianak if you want to improve the quality of education in Pontianak.

## METHOD

The method used in achieving the objectives of the training program is the implementation of in-service in the form of training and mentoring in the development of inquiry learning tools using MGMP-based lesson study strategies. The lesson study strategy carried out consisted of (1) the planning stage (plan), (2) the implementation stage (do), and (3) the reflection stage (Lewis, 2004). The training carried out was training in developing and implementing inquiry tools for science and social studies subjects. Assistance is also carried out related to improving the ability of

teachers in designing, implementing learning made, and improving learning design.

The techniques used in this training are: 1) workshop on designing inquiry learning tools in science and social studies subjects, 2) mentoring Pontianak city junior high school teacher activities in designing and implementing science and social studies in their respective classes, and 3) monitoring learning activities which have been carried out by the teacher. The research subjects were science and social studies teachers at Pontianak City Middle School who were involved in the Science MGMP and IPS in Pontianak. In full, the lesson study strategy used consists of three stages, namely: planning (plan), implementation (Do), and reflection (See). Explanation of each training phase is as follows:

a. Planning

At this stage, the science and technology team for the community conducted workshops for middle school science teachers and junior high school social studies teachers who were members of the Pontianak city MGMP. The activities are in detail as follows:

1. Introduction to inquiry learning in science and social studies subjects by the coaching team.
2. Modeling the application of inquiry in science and social studies by the coaching team.
3. Divide the teacher participants into several groups where one group consists of 5-6 participants, the number of groups is eight groups (the number of participants is 48 teachers from 24 junior high schools).
4. The coaching team guides discussion groups in making lesson plans, worksheets, assessments, and media that are suitable for learning (the team leader guides three groups, the other team members guide three groups and two groups). Each group chooses one of the material that will be made lesson plan, student worksheet, assessment, demonstration media in learning, and supplement inquiry learning in science and social studies subjects.
5. Provide opportunities for each group to model the lesson plan they have made.

b. Implementation (Do)

At this stage, each group consisting of 5-6 Science teacher participants shows the learning tools they have made. One teacher participant becomes a model in implementation. Furthermore, demonstrating how to use lesson plan and student worksheet in science learning. One teacher participant becomes the model while the other becomes the next teacher the partner who together with the coaching team acts as an observer to observe the process of conducting the trial. During the learning, process recording is done, and a learning CD is made.

c. Reflection (See)

This reflection phase consists of two activities, namely: The science and technology team observes science and social studies that have been implemented based on inquiry that has been made by the teacher and provides input to the module and student worksheet. The IbM team conducts discussions with the model teacher and partner teacher to reflect on the learning activities that have been carried out by the model teacher. The activity begins with reflection by the model teacher. The focus of the discussion is on students' activities in learning, their weaknesses, and strengths in participating in learning discussed together, not just looking for teacher shortcomings in learning. The results of this reflection are used by teachers to improve the lesson plan, student worksheet, assessment, and inquiry supplements for teachers. In full, the lesson study strategy in the IbM program activities is seen in Figure 1.

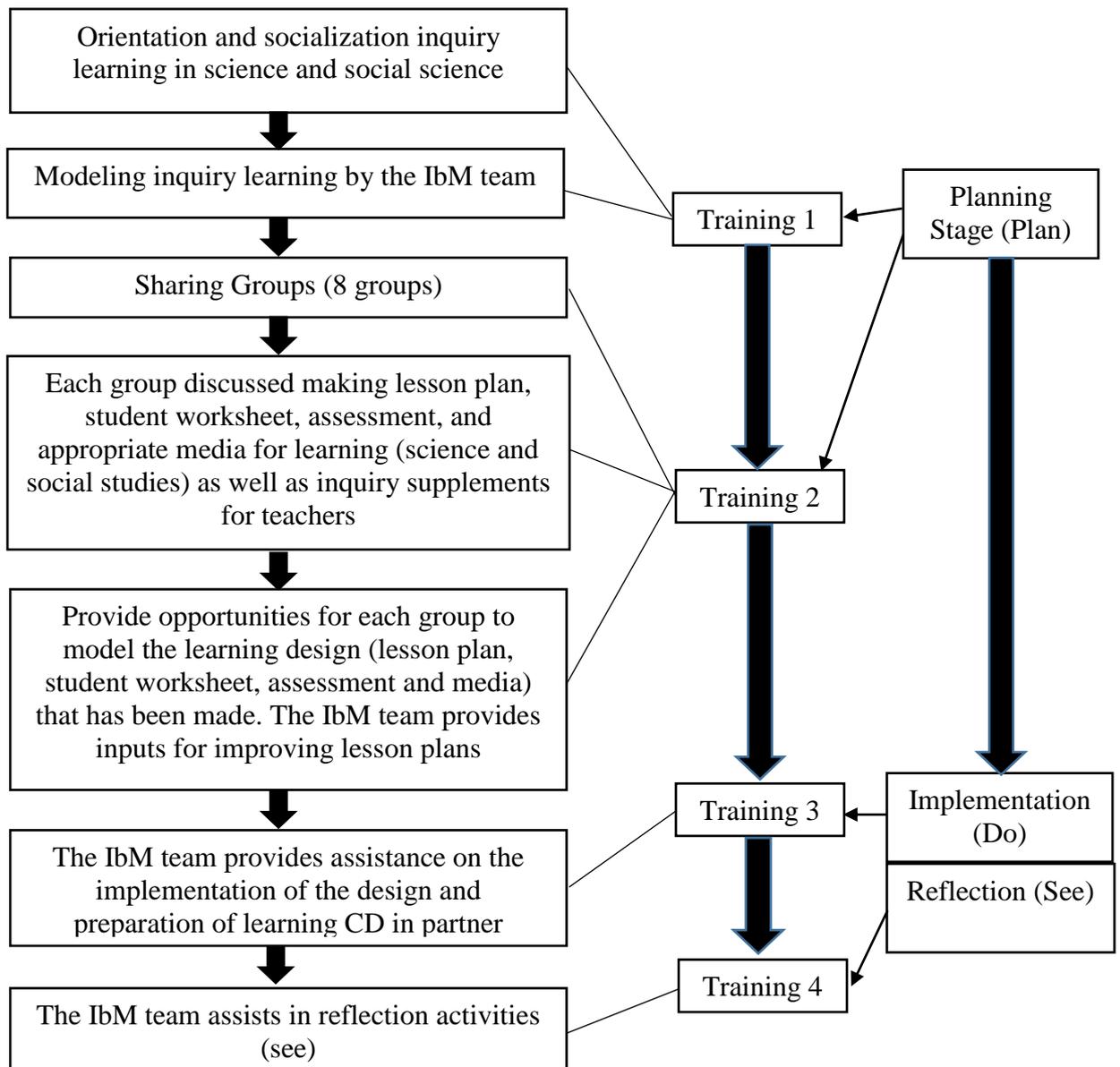


Fig. 1 Method of Lesson Study in Training Programs

## RESULTS AND DISCUSSIONS

Prior to the implementation of the main activities, preliminary activities were carried out in the form of coordination between the IbM team and the head of the Natural Sciences MGMP and the IPS MGMP. In the meeting socialization of the IbM proposal, preparation of the IbM training schedule, place for training activities and invited teachers (Figure 2).



Fig. 2 Coordination Meeting with the MGMP IPA Team and the IPS MGMP in Pontianak City  
The results of the IbM program have been achieved through four trainings given to science and social studies teachers who are members of the Natural Sciences MGMP and IPS MGMP as follows:

a. Training 1. Introduction to the Inquiry Model in Learning

Training 1 was focused on socializing the inquiry learning model in science and social studies subjects. The training material included an explanation of the stages in inquiry accompanied by examples of inquiry learning tools in science and social studies subjects and modeling of inquiry learning by the IbM team. All procedures in the preparation of inquiry tools are socialized in these activities, namely: (1) analysis of key concepts based on basic competencies (KD), (2) preparation of learning indicators based on key concepts / principles, (3) determination of laboratory context / facts used in supporting learning on key concepts / principles, (4) preparation of lesson plans, (5) preparation of practicum referrals in the form of student worksheets , (6) preparation of authentic assessments, (7) inquiry supplements for teachers and students in carrying out inquiry learning, and (8) making learning CDs.

To evaluate the success of the dissemination activities, the teacher response screening activities were carried out to the training activities using a questionnaire response with two alternative answers, namely: "yes" and "no." The partner teacher's response to inquiry learning consists of the pleasure of training, the usefulness of activities, additional information, understanding of the 2013 curriculum, making authentic assessments, implementing inquiry learning, and increasing collaboration with colleagues. In full, the results of the teacher response questionnaire can be seen in Figure 3.

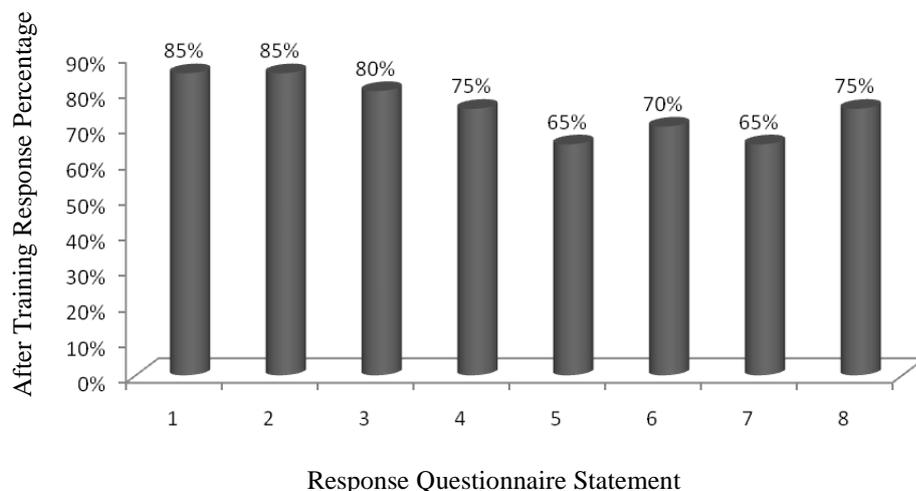


Fig. 3 Teacher Response to Training Participants

Information:

1. Exciting Training Activities
2. Training Benefits

3. Addition to Learning Process Knowledge
4. Understanding of Curriculum 2013
5. Understanding the Inquiry Model
6. Understanding of making authentic assessment
7. Interest in applying inquiry models in learning
8. Interest in collaborating with colleagues

Figure 3 above shows that the teacher's response to the understanding of the inquiry model and the application of inquiry learning has the lowest percentage compared to the teacher's response to other statements. The questionnaire was filled out after the inquiry model socialization (training 1). The implementation of the inquiry model in learning science and social studies has not been provided with assistance, so the teacher's knowledge of the inquiry model is not yet intact. It can lead to the lowest percentage of teachers answering "yes" about the statement "understanding of the inquiry model." Reaffirmed from the results of interviews with teachers after the questionnaire analysis, information was obtained that the model of inquiry was still unclear for the teacher.

b. Training 2. Mentoring for Making Lesson Plan and Authentic Assessment Model Inquiry

Training 2 was focused on group sharing activities and mentoring for making learning devices using inquiry models for science and social studies subjects. Activities include the preparation of the lesson plan, student worksheets, authentic assessment, learning media, and modules for teachers and students. This activity was conducted on May 28, 2016, at SMP 6 Pontianak. In this training 2, partner teachers were also given the opportunity to model the learning design that had been made, while the IbM team provided inputs for improving lesson plans.

Intensive discussion about how to develop questions to guide students in conducting inquiry between partner teacher-teacher partners and partner-implementing teacher teachers was carried out during inquiry modeling. The results of this mentoring activity are in the form of improvements to lesson plan, student worksheet, KIT IPA, and authentic assessments.

c. Training 3. Implementation of Lesson Plan and Authentic Assessment

Training 3 focused on the activities of mentoring the implementation of the design (do) and the making of learning CD for open lesson activities in partner schools 1 and partners 2. Chemistry teachers formed groups according to their respective fields to discuss and work together in designing learning devices. Learning devices that have been generated are then modeled in front of the real class. This modeling aims to obtain input and suggestions from colleagues related to the learning tools that have been made so that a better learning device can be obtained. During the "do" activity, the observer from the teacher participant makes an observation ("see") using the observation instrument. Observations are focused on student activities. Observer goes around to make observations. The results of the observer's activities are discussed in the reflection activity, and then all stages in training three are included in the learning CD. The implementation of training three is presented in Figure 4.



Fig. 4 Teacher Applies Authentic Lesson Plan and Assessment to Training 3

d. Training 4. Reflection Mentoring

Training 4 focused on mentoring when discussing the results of "do" in training 3. The activity was guided by the IbM team and the chair of the IPS MGMP / IPS MGMP. The observation sheet and learning CD were discussed in the activity. Many things are discussed in see activities, especially the problem of student learning difficulties. There are still students who do not carry out

learning activities optimally. But overall, the learning done by the model teacher was good enough and received praise from all observers.

Teachers in learning have developed critical thinking skills and scientific thinking. At each learning activity, the teacher always gives questions to direct students to think critically to find answers through their experiments. It is in accordance with the main purpose of learning with inquiry, namely to develop intellectual and thinking skills by giving questions so that they get answers on the basis of their curiosity (Sanjaya, 2011). In line with Nugent's opinion, et al. (2008) that in inquiry learning the instructor/teacher facilitates the discussion by giving questions and also providing appropriate explanations.

Mentoring activities begin with a reflection from the model teacher. Reflections at the end of each stage of Lesson Study allow learning improvements to be made, both in the form of learning models and scenarios, material teaching and alternative learning. The presence of observers in this implementation makes it possible to obtain information about learning or student learning activities in diverse classes both regarding the observed substance and from the depth and accuracy (Hendayana et al. 2008). Results of teacher reflection model:

1. The ability to ask is still lacking.
2. A little "nervous" with the presence of observers in the classroom.
3. Feeling guiding students is still not optimal.

Furthermore, the results of the analysis of the observation sheet that was filled in by the observers in the "do" activity obtained the following data:

1. In general, the stages of inquiry have been carried out by the model teacher.
2. Students are more than 50% active in learning.
3. There are still conclusions made by students that are not in accordance with the problem.
4. Authentic assessment has been carried out by the teacher well.
5. The teacher has facilitated students to discuss by giving appropriate questions and explanations.

The findings from the observation and reflection of the teacher's model were then discussed by the team to make improvements. The results of training activities 4 are learning tools consisting of revised lesson plan, student worksheet, and authentic assessments. To evaluate training activities, a questionnaire for students' responses to the learning that has been carried out is conducted. The results show student responses that are positive for learning. As many as 22 (88%) students agreed that the learning applied by the teacher was more pleasant, 24 (96%) students agreed that the learning carried out by the teacher made it easier to understand science material, and 23 (92%) students agreed that practical activities and discussions what has been done is more interesting. At the end of the activity, the teacher participants were given the same response questionnaire in the socialization activities (training 1). The results showed that there were changes in responses from the teacher after going through several stages of the training program activities. The full results can be seen in Figure 5. The results obtained (Figure 5) show that the teacher's views on inquiry changed after undergoing several stages of training activities. Inquiry learning can initially make a person feel difficult or even frustrated, but in the end, they feel comfortable with this learning (Nugent et al., 2008).

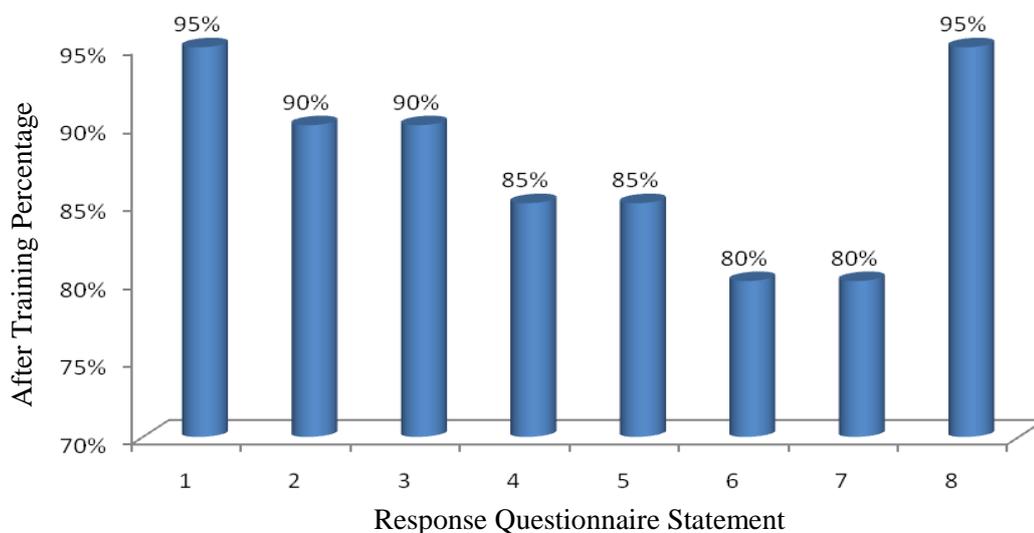


Fig. 5 Teacher Responses to Training Participants 4

Information:

1. Exciting Training Activities
2. Training Benefits
3. Addition to Learning Process Knowledge
4. Understanding of Curriculum 2013
5. Understanding the Inquiry Model
6. Understanding of making authentic assessment
7. Interest in applying inquiry models in learning
8. Interest in collaborating with colleagues

## CONCLUSION

Based on data analysis and discussion, it was concluded that the training program for the preparation of inquiry learning tools for teachers belonging to the MGMP IPA and MGMP IPS had achieved the expected goals, namely increasing the knowledge and skills of science and social studies teachers in designing inquiry learning tools. It is indicated by the results of the response questionnaire and the outcome of the activities produced, namely: lesson plan, student worksheet, authentic assessment, KIT learning, and learning CD. Science and social studies teachers from partner schools need refreshment of integrated science material and integrated social studies because the assistance that has been done has not been specifically focused on the material.

The advice that can be given from this training program is that it is better to determine in advance the material of junior high school science and social studies that will be prepared in the training program. It is intended so that the implementation of lesson plan in the class can be scheduled properly and has a not too long interval between the design and implementation of the design training that has been made. In addition, a thorough evaluation of the shortcomings and strengths of the implementation of this training is needed so that things can be improved in the implementation of the training.

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