

Mathematics Education Officials Level and Content of Reflection in the Context of Lesson Study Training

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Lesson Study serves as a vehicle to enhance teacher learning through observation and reflection about their own and others' teaching. Critical reflection does not only develop mathematics content knowledge, but also mathematical pedagogical content knowledge (PCK). However, low levels of reflections are generally not associated with the improvement of lessons nor with the development of mathematical knowledge for teaching. It is not only the level of reflection that matters, but also the content of reflection. For example, reflections about the teacher's dress and voice are not helpful when it comes to the improvement of a lesson. The purpose of this study is to establish the content and the level of the mathematics education officials' reflection in the context of Lesson Study training.

The three levels of reflection that were used in this study are based on the work of Van Manen (1977): Level 1 is general descriptive reflections, Level 2 is more specific reflections that compares or addresses the 'why?' question, and lastly Level 3 reflections offer alternatives with explanations. In terms of the content of reflection, we built on the work of Stols, Ono and Rogan (2015) and were able to identify six different categories of reflection. They are, from the least to the most significant: reflections about logistics (e.g. chairs, tables), mode of instruction (e.g. learner-centred, real-life), the lesson objectives, the methodology (e.g. fold paper, application), the quality of the conceptual development, and lastly, the development of mathematical thinking. The idea of our Lesson Study training was that officials' post lesson study reflections should 'move' from lower level reflections about insignificant content to a deep level reflection about more meaningful content. This should be an indication of the success of this professional development activity because lesson observation and post lesson reflections should improve teachers' subject knowledge, PCK, and teaching practice through individual and group reflection. The reflections in the top left corner (low level about not important content) are the least useful, while those in the bottom right corner (high level about important mathematics) are the most useful when it comes to the improvement of the lesson.

We analyse ten officials' post-lesson reflections before and after a month of intensive training. On the first and last day of training we showed the same video about a grade 7 mathematics lesson about fractions and give them an hour to write down their reflections. In this paper, we will discuss the results of this study. This includes the nature of these officials' reflections in terms of our framework. Here, we pay close attention to the 'move' in terms of the level and the content of the reflections. The first number in the table indicate the number of reflections in each category BEFORE the intervention and the second number AFTER the intervention. Before the intervention most of the reflections was on an observation (low level) about logistical issues, the mode of instruction, and the methodology. After the intervention, there was a shift towards higher

levels of reflections about the mode of instruction and conceptual development. It is important to mention that the reflections about the development of mathematical thinking skills were almost non-existing before and after the intervention.

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Improving Teacher Competency at Cluster I and II in Sukasada District through the Teachers Workgroup Reinforcement Based on Lesson Study

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This research was aimed in improving the elementary school teacher's competency at cluster I and II in Sukasada District through the teacher's workgroup reinforcement based on lesson study. Based on the teachers' status at cluster I, there were 46 teachers (58.23%) as the civil servants and 33 teachers (41.77%) as the contract teachers. From the 46 civil servant teachers, there were only 23 teachers (50%) in IV/a, the rest of them 2 teachers (4.35%) were in II/b, there were 2 teachers (4.35%) in II/c, there were 3 teachers (6.52%) in III/a, there were 10 teachers (21.74%) in III/b, there were 4 teachers (8.70%) in III/c, and there were 2 teachers (4.35%) in III/d. So, there were 50.00% of teachers in cluster I at Sukasada district still in category II and III. Based on the teachers' status in cluster II, there were 34 teachers (48.57%) as the civil servants and 36 teachers (51.43%) as the contract teachers. From the 34 civil servant teachers, there was only 19 teachers (55.88%) in IV/a, the rest of them 5 teachers (14.71%) were in III/a, there were 5 teachers (14.71%) in III/b, there were 4 teachers (11.76%) in III/c, and there was 1 teacher (2.94%) in III/d. So, there were 44.12% teachers in cluster II at Sukasada district still in category II and III. The design of this research was an action research starting from plan, action, evaluation, and reflection. This research was done at cluster I and II in Sukasada District. The subject in this research was the elementary school teachers who was taught natural science, social science, and mathematics. While, the object in this research was teacher's competency in designing lesson plan and applying lesson plan in the classroom. In achieving the purpose of the research, the research procedures which was done divided into three steps, they were: first, lesson study's plan including lesson study's workshop, designing lesson plan, and assessing lesson plan. Second, lesson study's action by teacher's model, teacher's assessment in applying lesson plan in the classroom, and data analysis. Third, lesson study's reflection. Teacher's competency data in designing lesson plan and applying lesson plan in the classroom was collected by using checklist and observation method. Whereas, the data analysis used descriptive analysis by determining the mean of the teacher's competency in every cycles. The result of this research showed that: 1) there was an improvement of the teacher's competency in designing lesson plan in the amount of 18.1% from the first cycle was 65.7 (average category) to the second cycle was 83.8 (good category), 2) there was an improvement of the teacher's competency in applying lesson plan in the classroom in the amount of 13.8% from the first cycle was 75.4 (average category) to the second cycle was 89.2 (good category), and 3) overall, there was an improvement of the teacher's competency in the amount of 15.9% from the first cycle was 70.6 (average category) to the second cycle was 86.5 (good category). Thereby, the teacher's workgroup reinforcement based on lesson study could improve the elementary school teacher's competency at cluster I and II in Sukasada District.

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Teaching Mathematics through Problem Solving vis-a-vis Primary Teachers Perception of Good Mathematics Teaching

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Our adaptation of lesson study (LS) involves our privileging of a particular lesson design for the research lesson. This lesson design is called teaching mathematics through problem solving (TMtPS). TMtPS developed from our years of conducting training courses for our in-service teachers to enhance their subject matter knowledge and pedagogical content knowledge. However, while teachers appreciate TMtPS lesson design as recipient of this teaching specifically for developing mathematical thinking and for making connections, they are not confident to use it for classroom teaching. Thus, we turn to lesson study as a professional development model to support teachers to adapt TMtPS as one of their strategies for teaching mathematics. The study we report here serves as baseline information for developing the support model. Our study focused on the question, What do teachers perceive as effective mathematics teaching and how does this compare with what is privileged mathematics teaching practice in a TMtPS lesson? To answer this question, we used the data gathered from an international comparative study participated in by a sample of 40 primary school teachers. The study involved collecting data through viewing vignettes from eight lessons. The teachers identified the best and weakest aspects of each lesson after which, they chose the lesson which they consider typical teaching, most effective and least effective and to provide reasons for their choice. The results revealed that in all three questions, teachers considered use of models or 'manipulatives', learner participation, and focus on content as constitutive elements of good mathematics teaching. We further teased out the teachers' articulation of each of these constitutive elements in terms of the degree to which they approach the privilege practice of TMtPS. We report these in our presentation and how these could inform our initiation of teachers to TMtPS and through lesson study.