

Abstract Number: 20418

Open Approach Lesson Study as a Model for Improving Teaching Mathematics

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Thinking skills is the most important competency necessary for 21st century, especially, thinking skills in the domain of science and mathematics. However, traditionally, most of school teachers around the world still teach mathematics focusing on delivering contents to students. Students' mathematical has been ignored. To challenge this, many countries have adapted an idea of Japanese Lesson Study to their classroom. Inprasitha (2002) has also challenged to adapt not only the idea of Lesson study, but also the Open-ended Approach Method (Becker and Shimada, 1997) to change classroom teaching practices in Thailand.

The research aimed to investigate how 'An open approach Lesson Study' has become an innovative model for improving mathematics classroom teaching practices. Target group was 10 teachers, 10 mathematics educators, 10 school principals participating in 5 lesson study workshops during May ' August 2017. Two teachers teach 2nd and 5th grade students in each workshop and 10 mathematics educators and 10 school principals participated in post discussion after having 2 public lessons with more than 200 audiences in each workshop.

The results revealed that planning the lessons using translated Japanese mathematics textbook (Gakko Toshō, 2005), teaching through 4 steps of Open Approach, and following by post discussion among one teacher, 5 mathematics educators and one school principal are important aspects of a model of open approach lesson study that facilitating teachers to become aware of their traditional teaching approach, especially 'being quiet' in the second step of Open Approach is the most difficult skills to be improved. Post discussion with students' written works deepened their understanding on mathematics contents and being aware of 'carefully read textbook' will help them understand 'students' ideas' Most of teachers who teach the classes expressed their ideas that students can think by themselves, rather their strong beliefs that students cannot think by themselves.

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A Study on Lesson Improvement by Introducing Assessment in Zambian Lesson Study-Focusing on Assessment Literacy of Mathematics Teachers-

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In the Republic of Zambia, Lesson Study Support Project was started by JICA (Japan International Cooperation Agency) technical cooperation in 2005. The main purpose of this project was to promote implementation of Lesson Study through existing In-service training program. The Lesson Study contributed to disseminate methodology of Lesson Study to stakeholders. However, the Zambian Lesson Study was pointed out several qualitative problems (Ministry of Education, 2009). There were so many teachers who consider simply conducting the group work as the learner-centered lesson.

As Fujii (2014) has been pointed out, the characteristics of the Lesson Study is a point that starts from the "question", "the question" is born from the gap of the actual situation of students and pedagogical norms of teachers. In this study, author verified the effect of the lesson improvement by introducing formative assessment and diagnostic assessment into Zambian Lesson Study. In this paper, in order to discuss the actual conditions of Zambian students, author consider them from the viewpoint of the teacher education research by using term of "Assessment Literacy". The Assessment Literacy is defined as "the ability to develop the assessment to reflect accurately the learning objectives to the understanding and achievement of the student" (Mertler and Campbell 2005; Stiggins 2002). By defining it as professional development of teachers, it affects the lesson improvement, and it also would be connected to endogenous development of Lesson Study. The author tried to clarify empirically Assessment Literacy of Zambia teachers focusing on the relationship between lesson improvement and their assessment literacy.

From teachers' discourse of group B, it was observed lesson improvement based on the learning condition of students. Mathematics teacher has explained by using diagrams which has prepared for mistaken students in the Lesson. The teacher has tried to response flexibly to students' misconception. The discourse of mathematics teacher group led to lesson improvement. On the other hand, general teacher group couldn't realize student misconception.

It was clarified that reality of lesson improvement through framework of teachers' assessment literacy. And indicated the direction of development to the lesson improvement through considering context of the lesson study in Zambia. Next issue is to continue to consider more deeply about relationship between way of students understanding and teachers' assessment literacy.

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Recognition of Students from Disadvantaged Social Backgrounds: Shaping Teachers' Beliefs in Lesson Study in Singapore

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This study is situated in the context of Singapore to examine teachers' professional growth via lesson study activities. It analyzes the opportunities afforded by the social language for teachers to learn from each other when engaged in their discussions during lesson study. Studies have recently described how lesson study has been implemented in Singapore (Lim et. al., 2011; Lim-Ratnam et. al., 2014; Saito, et. al., 2013; Tan, 2014). However, limited studies have investigated what is actually happening in teacher interaction during lesson study activities (Dudley, 2013), how lesson study provides specific opportunities for teachers to learn more about their students, content and approaches of teaching, and their own cultural beliefs that shaped their professional development. This qualitative study draws on the perspective of 'recognition' raised by Nancy Fraser (2003), through studying the mixture of cultural meanings appropriated by a group of teachers participating in lesson study in two elementary schools serving students from disadvantaged backgrounds in Singapore.

The primary purposes of this study are: (1) to acquire an in-depth understanding of the nature of Singapore teachers' beliefs about diversity based on ethnicity, socio-economic status, and language, and how they enact these beliefs during the process of participating in lesson study; and (2) to identify the factors during the lesson study process that mediate teachers' understanding of their roles of working with students from disadvantaged backgrounds. The participants included two groups of grade 4 mathematics teachers (n = 19 in total, 7 from School A and 12 from School B) in their regular discussions every three weeks during the academic year 2016-2017. Each discussion session was 90' 20 minutes. Two of the 1-hour research lessons were also observed. Interviews were conducted with individual teachers for 45' 0 minutes. The transcribed data were analyzed using the 'key incident' approach in which important events (usually recurring events, events that have sustaining influence) are identified from the observation notes and placed about other incidents, events, or theoretical constructs (Wilcox, 1982). Then, these key incidents were summarized on matrix displays using techniques suggested by Miles, Huberman, and Saldana (2013) for standardizing and processing qualitative data.

The initial findings from the lesson study research project suggested that teachers face several constraints in working together to meet the students' diverse needs and tend to focus on meritocracy and high-stakes exams. The reductionist interpretations of diversity prevail and reinforce the biases against the disadvantaged children. However, the open discussions on the teaching materials with evidence collected about student learning featured with 'friendly challenges,' can help teachers to reflect upon their unwarranted perceptions of their students and learn from each other to find more about students and their teaching. The study provides us with insights of how teachers' understanding of their students from diverse backgrounds, content and teaching change or re-enforced as they participate in the lesson study activities.