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Teachers' Beliefs about Teaching Practices in the Context of Lesson Study and Open Approach

Maitree Inprasitha ^{a*}, Narumon Changsri ^b

^aCentre of Excellence in Mathematics, CHE, Si Ayutthaya Rd., Bangkok 10400, Thailand

^bCenter for Research in Mathematics Education, Faculty of Education, Khon Kaen University, Khonkaen 40002, Thailand

Abstract

This study aimed to explore teachers' beliefs about teaching practices in the context of lesson study and Open Approach. Lesson Study and Open Approach have been introduced as innovations in 2 project schools in 2006, 1 project school in 2007, and 18 project schools in 2009. The target group consisted of 132 teachers from 21 project schools that had implemented lesson study and Open Approach to the teaching mathematics in their schools. The data were collected by 5-likert scale and open-ended questionnaire administered in 2011 academic year. The findings showed that there were 3 categories of beliefs about teaching practices related to lesson study and Open Approach which the teachers responded to the questionnaires. Those three categories were beliefs about teaching mathematics, beliefs about learning mathematics, and beliefs about social context, which are different from those of beliefs teachers had before entering the project. Teachers' long-held beliefs such as the role of a teacher is to give lectures, to explain some examples, laws or formulas as prescribed in the textbooks hoping that would help their students to understand subject content and to memorize the laws or formulas, has been questioned by themselves. This allows teachers a space to provide their students to encounter problem solving and will accumulate new kind of teachers' beliefs about teaching practices.

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1. Introduction

Research findings on how teachers teach reveal that the practices were rather complicated (Koehler, M. & Grouws, C., 1992) because teaching is not a simple skill but rather a complex cultural activity that is highly determined by beliefs and habits that work partly outside the realm of consciousness (Stigler & Hiebert, 1999). Beliefs about the teaching of mathematics were the driving forces for a teacher's teaching practice (Hart, 2002). It is, therefore, obvious that the main obstacle to the introduction of new educational innovations into practice is the teachers' holding fast to the conventional beliefs in the teaching of mathematics (Ross, McDougall and Hogaboam-Gray, 2002; Maass, 2009). A good example of teacher belief that presents itself as a hindrance to changes in teaching practice is the belief that finding the only one correct answer is most important in solving a mathematics problem (Emori, 2008). There is also another belief that the teachers have to play the role of a lecturer who dispenses bodies of knowledge and explains to their students the subject content, that teachers' lead can help the students to solve problems, that teaching the students to understand laws and formulas and to coerce them to

*Corresponding Author: Maitree Inprasitha. Tel.: +66-43-203165
E-mail address: inprasitha_crme@kku.ac.th

memorize these were the best way to learn. They also believe that they should spend a greater part of allocated time to covering the subject content as required by their schools and that different student capabilities can obstruct the success of their teaching. Most teachers' teaching role begins by explaining new subject content to the students (Inprasitha, M., 2011). Inprasitha and et al., (2003) suggested that the proper way to develop teaching profession for a change in classrooms is to do it regularly as well as constantly in each of the teacher's class. This idea is in line with Japan's teaching profession development scheme called Lesson Study. It calls for a slow but constant effort to bring change to the classrooms. As Yoshida (2008) points out, ideas concerning professional learning processes like Lesson Study emphasize works that allow teachers opportunity to develop learning activities in his/her own classroom. Lesson Study is a process in which a teacher constantly tries to improve his/her teaching techniques by working together with other teachers to verify and criticize different teaching techniques (Baba, 2007). Such practice would open up an opportunity for the teachers to investigate and understand their students' learning by observing and discussing some specific lessons (Yoshida, 2005). The idea of Lesson Study is very simple. If a teacher wants to improve the quality of his teaching there's nothing easier than to work with other teachers in the preparation of lesson plans, to observe and reflect on classroom activities and to investigate the outcome of the activities (Lewis, 2001 & Lewis, 2011). In the case of Thailand each step of lesson study concentrates on cooperation among teachers, researchers and experts in the development of lesson plans, observation of classroom activities and reflection on the outcome of learning activities (Inprasitha and Loipha, 2007). The aforementioned demonstrations should be sufficient to show that lesson study and Open Approach have been introduced into the development of teaching profession and training as a key mover in achieving changes in teachers' teaching practice. It is the objective of this research to check into some teachers' beliefs regarding mathematics teaching within the context of lesson study and Open Approach in order to find out just how much these two innovations have actually changed the teachers.

2. Lesson Study incorporating Open Approach

In Thailand, lesson study started in 2002 by preparing the context for applying innovation into four areas of implementation; (1) the teacher training program, (2) the graduated study program, (3) in-service teacher training and (4) long term teaching professional development which was tried out with the fourth year students practicing their internship in 2002 (Inprasitha, 2004). In 2006, the Center for Research in Mathematics Education has been implementing lesson study in the *Professional Development Project* (ProDev). Unlike the Japanese lesson study, this project modified Japanese lesson study by incorporating Open Approach and emphasizing on "a unique collaboration" in every phase of lesson study cycle. This unique collaboration is comprised of school teachers, the 5th year undergraduate student doing their one year teaching practice at schools, graduate students, and mathematics educators, all from Khon Kaen University. This lesson study team then participated in collaboratively designing research lesson, collaboratively observing their friend teaching the research lesson, and collaboratively doing post-discussion or reflection on the activities of the two phases (Inprasitha & Loipha, 2007). According to these 3 phases of lesson study, Open Approach as a teaching approach is incorporated in the second phase as the following steps:

- 1) Collaboratively designing research lesson at least once a week; lesson study team designs research lessons by trying to apply the materials and subject matters to be taught in terms of open-ended problems. Then, those open-ended problems were transformed as mathematical activities by using 4–5 simple instructions. The instructions focused on the students' understanding of the problem situations by themselves either as an individual or a group based on the type of activity. In this phase, members of lesson study team participating in designing research lesson shared in designing materials to be appropriate with the students' activities or ages which based on collaboration of teachers who know their students' nature in classroom while the rest of members of lesson study team provide ideas about research issues. Moreover, they also collaborated in sequencing the teachers' questions by focusing on the question words "what, why, how" in order to stimulate and investigated the students' work as well as reasons of what they did themselves.

- 2) Collaboratively observing their friend teaching the research lessons at least 2–4 hours per week; the research lessons was taught in the classroom by the subject teacher of that grade using Open Approach as in the following steps; posing Open-ended problems, students' self-learning through problem solving, whole-class discussion and summary through connecting students' ideas. Classroom observation focused on students' responses

to open-ended problems and students' ways of thinking.

3) Collaboratively doing post-discussion or reflection on the activities of the two phases once a week; all members of lesson study team, the principal and other teachers in the school attended the regular meeting and then following by reflecting upon their teaching practices as follows; 1) the teacher who was a class teacher, reported what was observed during activity interaction of the students and what were the objectives of the lesson, including problems that were arisen. 2) The observing teacher reflected what was observed from the students' activities, whose perspectives could be either similar or different from those of the case-study teacher. 3) The researcher or school coordinator (graduate students) reflected viewpoints observed in the classroom and not mentioned by the case-study teacher and the observing teacher, for instance the given directions, thinking process of the students. 4) Occasionally, educational supervisor and mathematics educator collaboratively provided reflection. The reflection by the mathematics educator additionally provided profound academic perspectives from observing the students' thinking process.

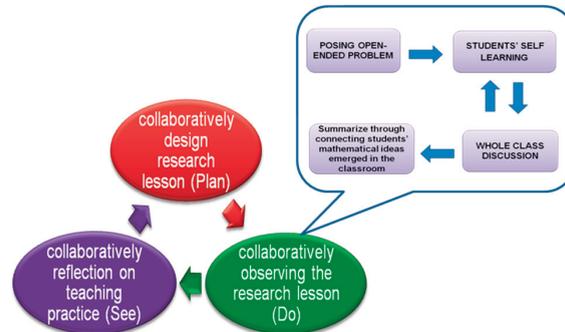


Figure1. Teaching Practices based on Lesson Study incorporating Open Approach (Inprasitha, 2010; 2011)

3. Research Method

The target group consisted of 132 teachers from 21 project schools. These schools have implemented lesson study incorporating Open Approach to the teaching mathematics in their schools conducted by the Center for Research in Mathematics Education, Faculty of Education, Khon Kaen University. The teaching practices set under the cycle of lesson study were as follows: 1) collaboratively designing research lesson at least once a week. 2) Collaboratively observing their friends teaching the research lesson taken 3-4 hours per a week. 3) Collaboratively conducting post-discussion or reflection on teaching practice conducted once a week. From these three phases, Open Approach was used as a teaching approach. The step of Open Approach are as follows; 1) posing open-ended question 2) students' self learning through small group working 3) whole class discussion and 4) summarizing through connecting students' mathematical ideas emerged in the classroom. The data were collected by 5-likert scale and open-ended questionnaire administered in 2011 academic year. 93% of respondents were received from questionnaire distribution among the target group.

4. Results

4.1 Traditional Beliefs; Results from Open-ended Questions

A review of the teachers' answers to the open-ended questions in the questionnaire concerning their teaching practice prior to their participation in the project revealed that the majority of them taught by placing emphasis on lecturing or explaining laws and formulas and showing examples before assigning exercises for the students to do. The following findings are some examples of opinions as expressed by the teachers:

"I usually taught by showing the students examples and then I would ask them to do exercises I give to them. If their answers are correct they are correct I don't bother to find out the process through which they arrive at the answers," – from a female teacher, aged between 41-50 years old and had taught mathematics for 19 years. She

had, in the project, played the roles of an instructor and observer, and had taken part in lesson planning and reflection sessions.

“My teaching is in accordance with the textbooks assigned by the Ministry of Education. I usually teach by explaining to my students what I know and have never bothered to let them express their ideas. I just always explain,” - from a female teacher, aged between 41-50 years old and had taught mathematics for 20 years. She had, in the project, played the roles of an instructor and observer, and had taken part in lesson planning and reflection sessions.

“I study lesson plans and organize learning activities according to the plans. I do lecturing mostly, but also explain some examples on a white board, in accordance with the instructions prescribed in the textbooks before assigning my students to do the exercises,” – from a female teacher, aged between 51-60 years old and had taught mathematics 35 years. She had played the roles of an observer and had participated in the reflection session.

“I mostly review my students’ prior learning, then, I explain and give them some examples in the exercises. I also instruct them to memorize the laws and formulas. Then, I assign exercises for them to do, show them the solutions or check their exercise books,” – from a female teacher, aged between 41-50 years old and had taught mathematics for 24 years. She had, in the project, plays the roles of an instructor and observer, and had taken part in lesson planning and reflection sessions.

It can be seen that teaching practices in the context of lesson study and Open Approach clearly reflect the teachers’ long-held belief that the role of a teacher is to give lectures, to explain some examples, laws or formulas as prescribed in the textbooks hoping that would help their students to understand subject content and to memorize the laws or formulas.

4.2 Beliefs related to lesson study and Open Approach; Results from 5-likert scale and open-ended questionnaire

When this group of teachers participated in the lesson study project they were assigned to operate in accordance with the four steps of Open Approach, i.e. 1) posing open –ended question 2) students’ self learning through small group working 3) whole class discussion and 4) summarizing through connecting students’ mathematical ideas emerged in the classroom. These steps of learning activity are entirely distinct from the conventional teaching method of lecturing, explaining or demonstrating examples.

The teachers who participated in the project had played various roles of a participant in lesson planning, an instructor who implemented the lessons, an observer and a participant in the reflection session. Also in their weekly routine of conducting each step of Lesson Study they had found ample opportunity to exchange ideas with other teachers, the internship student, graduate students and the expert from Faculty of Education, Khon Kaen University. Such working context had inevitably led the teachers to learn how to organize learning activities and to understand better how students learn and would, eventually, help widen their points of view on the teaching of mathematics.

The following table shows the levels of opinions concerning teachers’ beliefs about teaching practices as expressed by the teachers after they had participated in the Project:

Table 1. Teachers’ Beliefs about Teaching Practices in the Context of Lesson Study and Open Approach

Teachers’ Beliefs about Teaching Practices	Mean	S.D.
Beliefs about Teaching Mathematics		
1. Teachers should allow students to decide on their own how to solve mathematics problems.	4.76	0.47
2. Mathematics teachers is to observe the students’ behavior while they are trying to solve problems	4.72	0.47
3. Teachers should put forward challenging problems for the students to discuss and to formulate problems on their own	4.75	0.47
Beliefs about Learning Mathematics		
1. Students are able to solve mathematics problems on their own.	4.42	0.70
2. Students can express their ways of thinking and the reasons underpinning their solutions.	4.66	0.65
3. Group discussion can lead to a conclusion to the lesson.	4.66	0.60
4. Student recognizes various ideas from other people.	4.65	0.54
5. Students enjoy learning mathematics.	4.63	0.52
Beliefs about Social Context		
1. Teachers are proud when other teachers or specialists observe their class	4.41	0.82
2. By reflecting on teaching performance, teachers can gain insight into their work performances and which parts should be improved or developed.	4.73	0.44

Teachers' Beliefs about Teaching Practices	Mean	S.D.
3. teachers have to open their minds to listening to their teacher friends' recommendations	4.66	0.63

From the questionnaire distributed to the targeted group, it was found that in three categories of beliefs there were new items about teaching practices related to lesson study and Open Approach which the teachers responded to the questionnaires. It can be said that teaching practices in the context of lesson study and Open Approach allow teachers a space to provide their students to encounter problem-solving situations and has formed new kind of teachers' beliefs about teaching practices.

5. Conclusion

The findings from this research has confirmed the idea that relation between teaching practices and teachers' beliefs though they are independent but not in the form of cause-effect type. Both teaching practices and teachers' beliefs are embedded in cultural contexts. Enculturating Open Approach as new teaching approach incorporating with lesson study provide chance for teachers to reflect upon their long-held beliefs and started to form new kinds of beliefs in related to this teaching practices. This finding is in line with the ideas as expressed by Koehler, U. & Grouws, D. (1982). It also corresponds to the ideas of Thompson (1992) and Handal (2003) which states that cultural factors such as teachers' belief influences their very own teaching practice.

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References

- Baba, T. (2007). "How is Lesson Study Implemented?". *Japanese Lesson Study in Mathematics: Its Impact, Diversity and Potential for Educational Improvement*. In M. Isoda, M. Stephens, Y. Ohara & T. Miyakawa (eds.). Singapore: World Scientific Publishing.
- Emori, H. (2008). We Shall Overcome Dysfunctional Beliefs For Introducing Communication Study. *Proceedings of APEC – KHON KAEN International Symposium 2008 Innovative Teaching Mathematics through Lesson Study III – Focusing on Mathematical Communication*- Khon Kaen University.
- Hart L. C. (2002) A four year follow-up study of teachers' beliefs after participating in a teacher enhancement project. *Beliefs: A Hidden Variable in Mathematics Education?*. G.C. Leder, E. Pehkonen, & G. Torner (Eds.). PP. 115-123. Kluwer Academic Publishers: Netherlands.
- Inprasitha, M. & Loipha, S. (2007). Developing Student's Mathematical Thinking through Lesson Study in Thailand. *Progress report of the APEC project: Collaborative Studies on Innovations for Teaching and Learning Mathematics in Different Cultures (II)-Lesson Study Focusing on Mathematical Thinking*. Center for Research on International Cooperation in Educational Development, Japan.
- Inprasitha, M. (2010). *One Feature of Adaptive Lesson Study in Thailand —Designing Learning Unit— Proceedings of the 45th National Meeting of Math. Ed. October 8–10, 2010. Pp. 59–7. Korea.*
- Inprasitha, M. (2011). One Feature of Adaptive Lesson Study in Thailand: Designing a Learning Unit. *Journal of Science and Mathematics Education in Southeast Asia*. Vol. 34 No. 1. Pp. 47-66.
- Koehler, M. & Grouwa, D. (1992). Mathematics Teaching Practices and Their Effects. *Handbook of Research on Mathematics Teaching and Learning*. In D.A. Grouws (Ed.). New York: MacMillan.
- Ross, J. A., McDougall, D., & Hogaboam-Gray, A. (2002). Research on reform in mathematics education, 1993-2000. *The Alberta Journal of Educational Research, XLVIII(2)*, 122-138.
- Stigler, J.W. & Hiebert, J. (1999). *The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom*. New York: The Free Press.
- Maass, K. (2009). What are teacher's beliefs about mathematics teaching?. In J. Cai, G. Kaiser, B. Perry and N.Y. Wong (eds.). *Effective Mathematics Teaching from Teachers' Perspective: National and Cross-Natinal Studies*. 141-161. Sense Publishers.

- Lewis, C. & Hurd, J. (2011). *Lesson Study Step by Step: How Teacher Learning Communities improve instruction*. Heinemann: USA.
- Yoshida, M. (2005). An Introduction to Lesson Study. *Building Our Understanding of Lesson Study*. In Patsy W-I & Makoto Yoshida (eds). Philadelphia: Research for better schools, Inc.