

Teachers' Values about Teaching Mathematics in Classrooms, Implementing Lesson Study and Open Approach: a Thai Experience^{1,2}

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The aim of this study was to explore teachers' values about teaching mathematics in the classrooms which implemented Lesson Study and Open Approach as a teaching approach. The targeted group was 83 school teachers from 4 schools participating in a teacher professional development project. The data was gathered through teacher questionnaires, lesson observations and interviews. Data analysis is based on Bishop's (1988; 2003; 2007) and Komin's (1990) frameworks. The results from the implementation of Lesson Study and Open Approach in Thai classroom found the different of the roles and behaviors of teachers and students in classroom. The results revealed 3 kinds of values about teaching: Mathematical values, General educational values, Mathematics educational values and also found that most of the teachers valued problem solving as an innovative teaching approach as against traditional approaches they were familiar with.

Keywords: Teachers' Values, Lesson Study, Open Approach, Learning activity

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MSC2010 Classification: 97B50

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INTRODUCTION

According to Bishop (2003), values are very important in research studies and teacher professional development since the values which teachers of mathematics bring to various aspects of their work profoundly affects what and how they teach, and therefore what and how their students learn. It was important that the teachers should be supported and encouraged in the values teaching involving the teacher's pedagogical identity and in the need to take value change into account in any move to achieve reform (Bishop, 2003; 2007).

In Thailand, although we have the National Education Act of B.E. 2542 (1999) recognizing the urgent need for education reform, one major aspects of this reform is '*learning reform*' – that is, attaching the highest importance to learners. The Act represents an unprecedented and long over-due break from traditional Thai educational norms such as lecturing and rote learning and instead sets the foundation for a more creative, questioning approach to studying. However, it can't be a real reform because of the low quality of the instructional system and learning supported system (Tongroach, 2008). Most school teachers have been attempting to improve their teaching practice. Unfortunately they lack the inspiration to be innovative and to improve their everyday work. Most teachers still use a traditional teaching style focusing on coverage of content but fail to put emphasis on student's learning process and their attitude toward learning with understanding. More importantly, a number of teachers classify themselves into a reforming group (*e.g.*, master teachers, initiative teachers etc.) but in effect do not realize that they are still in an old paradigm (Inprasitha, 2006). This calls for the second education reform for the next decade (2009–2018).

Bruner (1996 cited in Stigler & Hiebert, 1999) stated that the nature of teaching and learning should focus in real-life classrooms in which teachers and pupils alike go about their business – how teachers teach and how pupils learn. Stigler & Hiebert (1999) view was that improving the quality of teaching must be front and center in order to improve student's learning. Teaching is the one process in the educational system that is designed specifically to facilitate student's learning. Thus, the expansion of teachers' worldview or teachers' values for a new view is very important for educational reform and especially the needs of learning reform. Bishop (2007) stated that research studies were conducted for developing or changing the value and that it was not easy. Lesson study is an excellent method for studying the development of values in the classroom.

Lesson study is a system for school-based professional development of teachers. The most distinguishing features of this system are 'gradual development', 'continuous implementation' and 'focusing on classroom changes'. Lesson study cycles consist of

preparation/planning, application in classroom, and reflecting after class, referred to as “kyozai kenkyu” in Japan (Lewis, 2002; Baba, 2007; Isoda *et al.*, 2007; Inprasitha & Loipha, 2004). Lesson Study is used across the curriculum in many countries that has value for teachers and can change both teachers and students. Thus, lesson study would be suitable for Thai classrooms where teachers need to reform their teaching to affect their students' learning reform (Inprasitha, 2010). In Thailand, lesson study has been implemented since 2002 with an initiative of Inprasitha (2004) by integrating the notion of Lesson Study and Open Approach. In a sense, Open Approach is used as a subject matter of lesson study in this implementation.

However, ideas on lesson study have been in Japan for more than 100 years and have adapted to suit her socio-cultural contexts. Thus, implementing lesson study in Thai schools in a Thai socio-cultural context needs to be serious concern (Inprasitha, 2010). This concern always involves the teachers' values. The value differences might be obstacles bringing in and applying new approaches or innovation since the teachers might feel that it is very difficult and even unacceptable. So, they might return to what they are used to or try to change their own teaching techniques and working culture until accepting those approaches which led to their value changes in mathematics teaching in the long term and the sustainability of further mathematics teaching. For this research, the objective was to explore teachers' values about teaching mathematics in the classrooms implementing Lesson Study and Open Approach as a teaching approach.

IMPLEMENTING LESSON STUDY AND OPEN APPROACH IN THAI CLASSROOMS

In Thailand, Lesson Study has been implemented since 2002 with an initiative of Inprasitha (2004) by conducting a pilot study project at the Faculty of Education, Khon Kaen University, with 15 student teachers. Later on, in 2003, it was implemented in 2 schools in Khon Kaen Province. In 2006, lesson study was expanded for in-service teacher professional development by focusing on whole-school approach in two schools in the lab school project of the Ministry of Education of Thailand. In addition, in 2007, another two schools participated in this project. In 2009, the Center for Research in Mathematics Education (CRME) accepted an assignment from the office of the Higher Education Commission collaborating with the Office of Basic Education Commission extending the results of Implemented Lesson Study and Open Approach by creating networks with Ubonratchathani University and Chiang Mai University to extend results in 12 provinces in the northern region area and the north-eastern region of Thailand including 19 schools. These extended results followed the government policy allowing

the implementation for extending the national findings in 2010 school year (Inprasitha, 2009; 2010).

In this project, Open Approach as a teaching approach was incorporated in Lesson Study and has been implemented. For implementation of the first phase in the project schools, workshops were provided for every school teacher in the project under the care of Center for Research in Mathematics Education, Khon Kean University. Then, in the second phase, the lesson study cycle was implemented in schools starting from preparation/planning (every Monday or Tuesday after 3 pm), application in classroom (planning team came to observe class) and reflecting after the class (every Wednesday or Thursday after 3 pm) and for the third phase at the end of semester, an open class and summing up of the results of Implemented Lesson Study and Open Approach were conducted together.



Figure 1. Lesson Study cycle implemented in schools



Figure 2. Learning environment in Thai Classroom implemented Lesson Study and Open Approach

TO EXPLORE THE VALUES OF TEACHERS WHO ORGANIZED THE INSTRUCTION BY INNOVATION OF LESSON STUDY AND OPEN APPROACH

Bishop (1998; 2003) stated that at present there is little knowledge about what values teachers are teaching in mathematics classes, about how aware teachers are of their own value positions, about how these affect their teaching, and about how their teaching thereby develops certain values in their students. Values are rarely considered in any discussions about mathematics teaching, and a casual question to teachers about the values they are teaching in mathematics lessons often produces an answer to the effect that they don't believe they are teaching any values. This widespread belief that mathematics is the most value-free of all school subjects is not just held by teachers, but is also strong among parents, university mathematicians and employers (Ellerton & Clements, 1989 cited in Bishop, 2003). However mathematics is just as much about human and cultural knowledge as is any other field of knowledge, and adults certainly express feelings, beliefs and values about mathematics which clearly relate to the mathematics teaching they experienced at school (Brew, 1999; FitzSimons, 1994 cited in Bishop, 2003). Hence it is clear that values teaching and learning does go on in mathematics classes, as it does in all classrooms.

The values were what we gave worth, importance, acceptance, or rationale in action, living, until they were standards used for judging what we gave worth or importance. The value was one context affecting the teachers' practice (Thompson, 1992). Rokeach (1973) stated that the values played a very important role in human behavior as the judge, determiner, leader, or mover on behavior inclined in one direction. So, the values were powers hidden under human social behavior, especially those of teaching values. Bishop (2003) viewed that the teaching values existed in every class. In addition, the teaching values whether they were explicit or implicit, depended on the teachers' values. Besides, according to the studies of Inprasitha (2004), he suggests some affective aspects such as beliefs in meta-cognitive teaching model based on Nohda & Shimizu's ideas (1989; 2000 cited in Inprasitha, 2004). From this model, it can be seen that the major factors affecting the instructional management are teachers' prior values and experiences. The teachers' values were hidden under the socio-culture of the classroom. The values are the results of teachers' prior experiences. Moreover, the teachers' values would affect their teaching techniques. It follows the idea of Raths *et al.*, (1987 cited in Bishop, 2003) suggesting that the values are caused by each person's experience. Different experiences would cause different values as well. Furthermore, Bishop (2003) also stated that there was direct relationship between value and decision making. The decision making on how to deal

with classroom situation depended on each person's values.

In Thai Society, Komin (1990) conducted the research and surveyed Thai people's values by classifying them into 2 types:

- 1) Terminal values, and
- 2) Instrumental values.

For the values in mathematics classroom, they would be viewed as three kinds of values according to Bishop's (1988; 2003; 2007) approach: General Educational Values, Mathematical Values (rationalism/objectivism, control/progress, openness/mystery), and Mathematics Educational Values (accuracy, clarity, conjecturing, consistency, creativity, effective organization, enjoyment, flexibility, open mindedness, persistence, systematic working). These values continued simultaneously with the teachers' instruction. The teachers might or not be aware of what values they had. Teachers' being involved in new approaches, technology or innovation like Lesson Study and Open Approach was a condition making them aware of their own values since the teachers had to face new or unfamiliar situations which might impact on what they used to practice, focused on, or give worth or importance to before and slowly showed evidence of the inclusion of the teachers' values.

METHODOLOGY

The aim of this study was to explore teachers' values about teaching mathematics in the classrooms implementing lesson study and Open Approach as a teaching approach. The targeted group included 83 school teachers from 4 schools participating in a teacher professional development project under the care of Center for Research in Mathematics Education (CRME). The data was gathered through teacher questionnaires, from opinion on instructional management and by innovation in Lesson Study and Open Approach, lesson observations and interviews. Analysis was also carried out through teacher questionnaires, field notes of the researcher, audio and video recording of individual semi-structured interviews and the observation of the roles and behaviors of teachers. Analysis of the data was done by means of analytic description based on Bishop's (1988; 2003; 2007) and Komin's (1990) frameworks under the following model:

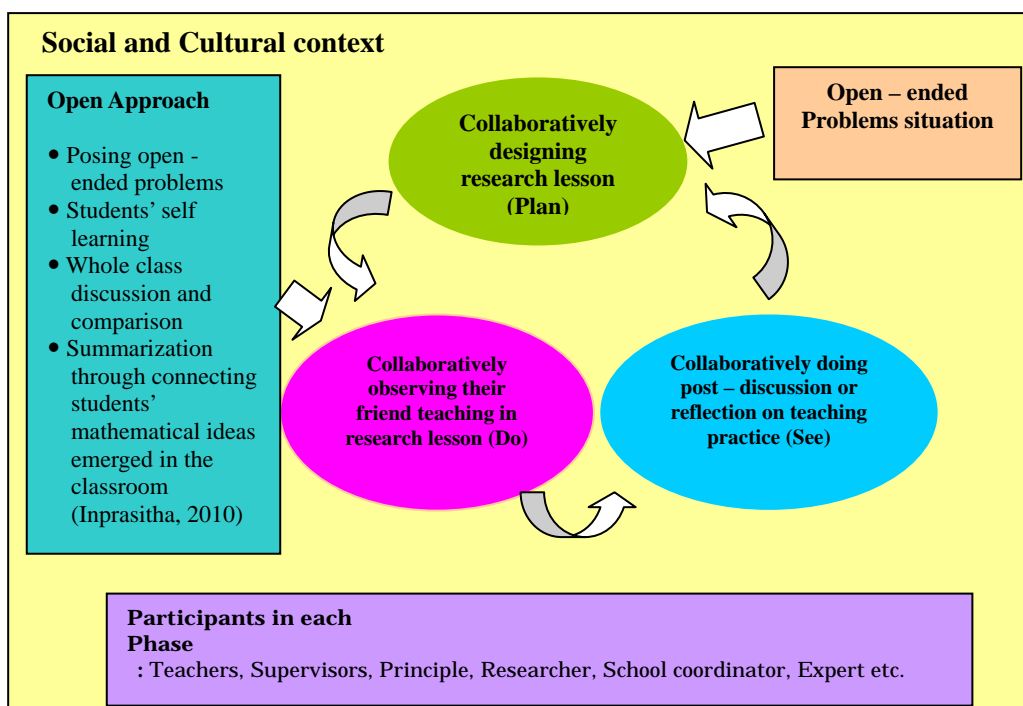


Figure 3. Model of Lesson study cycle and Open Approach for analysis of teacher's value (adapted from Inprasitha, 2006; Inprasitha, 2010)

RESULTS

Results are according to analysis through individual semi-structured interviews and the observation of the roles and behaviors of teachers and students in classroom since 2006–2008 (school year). The results from the implementation of Lesson Study and Open Approach in Thai classroom were shown in the table as follows:

Table 1. Changing Target

Changing Target	The First Year (2006 school year)	The Second Year (2007 school year)	The Third Year (2008 school year)
Students	<ul style="list-style-type: none"> • Not be brave to talk with their friends, express ideas, or ask when they were doubtful. • Not be able to write for explaining technique or the reasons completely. It was still be as writing to conclude the result or answer. 	<ul style="list-style-type: none"> • Be able to spend a long time with problem solving. • Be able to write explaining their approach or working with more delicate ideas, working with their friends, being more assertive. • Be able to present their own performance in front of the class with confidence. 	<ul style="list-style-type: none"> • Be able to present performance, ideas, or negotiate the others' ideas confidently and reasonably. • Be able to be patient with problem solving for a long time and attempt to solve problems by using various techniques. • Be able to write their own approach and working technique in detail.
Teachers	<ul style="list-style-type: none"> • Be worried and not be confident with their own role. • Not be confident in developing a knowledge management plan by open approach since it was difficult to work alone. • Be worried and afraid of being critiqued by others. 	<ul style="list-style-type: none"> • Have understanding of and be more confident in one's own role. • Understanding of the guideline in creating the lesson plan, and attempting to adapt one's own teaching technique. • Be able to accept the critique of others. 	<ul style="list-style-type: none"> • Have an understanding of and be able to accept working techniques with new approaches. • Continuously improve one's work. • By obviously lowering one's anxiety or plan development during the planning for teaching. One could anticipate the student's approach in discussion. • Be able to critique others and accept other's critique.

According to the analysis from the teacher questionnaires of opinion on instructional management by innovation in Lesson Study and Open Approach, lesson observations and interviews, the data was analyzed based on Bishop's (1988; 2003; 2007) and Komin's (1990)' approach as above. The findings were shown in the table as follows:

Table 2. Cycle of Lesson Study and Open Approach

Cycle of Lesson Study and Open Approach	Teachers' Actions Involving Values	Type of Values based on Bishop's (1988; 2003;2007) and Komin (1990)
Collaboratively designing research lesson (Plan)	<ul style="list-style-type: none"> • Spending time in designing the activities and material design so that everyone could participate in and be able to discover/search for Mathematical approaches hidden in activities by students. • Attempt to access the students' thinking technique as well as apply the students' thinking approach in planning for teaching and anticipating the students' possible approaches. 	<p>General educational Values : the attempt, collaborative working, independence, equality</p> <p>Mathematical Values : rationalism, objectivism, control, progress, openness, mystery</p> <p>Mathematics educational values : problem solving, survey, anticipation, interpretation</p>
Collaboratively observing their friend teaching in research lesson (Do)	<p>Posing open - ended problems</p> <ul style="list-style-type: none"> • Focus on learning process through problem solving process <p>Students' self learning</p> <ul style="list-style-type: none"> • Give an importance to the students' learning process. • provide an opportunity and independence in thinking <p>Whole Class Discussion</p> <ul style="list-style-type: none"> • Provide an opportunity in thinking and presenting approach/opinion with every student. • Attempt to enhance the student's methods in presenting different approaches. <p>Summary through connection</p> <ul style="list-style-type: none"> • Give an importance to the students' approach and applying those approaches in concluding and in discussion 	<p>General educational Values : the attempt, open mind</p> <p>Mathematical Values : rationalism, objectivism, control, progress, openness, mystery</p> <p>Mathematics educational values : openness, problem solving, survey, anticipate, interpretation, flexibility, systematic and efficient working, efficiency</p>

(Continued)

Cycle of Lesson Study and Open Approach	Teachers' Actions Involving Values	Type of Values based on Bishop's (1988; 2003; 2007) and Komin (1990)
<p style="text-align: center;">Collaboratively doing post – discussion or reflection on teaching practice (See)</p>	<ul style="list-style-type: none"> • Accept recommendations or critiques of the others (critique friend). • The administrators' academic leadership. • Depend on work improvement by Reflection. • Attempt to access the Students' thinking approach. 	<p>General educational Values : the attempt, collaborative in working, openness</p> <p>Mathematical Values : rationalism, objectism, control, progress, openness, mystery</p> <p>Mathematics educational values : openness, systematic working and efficient work management</p>

CONCLUSION

Teaching professional development based on lesson study approach and classroom organization based on Open Approach is a very simple idea as Lewis (Lewis, 2002) mentioned. However, when implementing it, this innovative approach is quite different from traditional approaches using short-term training. This makes the implementation more complicated and difficult. In addition, there was no continuous monitoring or following up of the implementation. Moreover, classroom organization is still centering on content explanation and exercise practice. This new kind of long range teaching professional development, which demands teachers doing things on their own, is not familiar to the teachers. This lack of familiarity made the teachers change their working culture including beliefs and values.

However, in the findings from implementing the approach or innovation as Teaching Approach in Thai Classroom, the teacher still viewed that it was very good technique because it provided an opportunity for the teachers to develop their own classroom organization process as well as the students searching for thinking techniques and answers until they could construct new knowledge by themselves. Furthermore, in Mathematics Instructional Management, it had to focus on each student's working process and thinking technique rather than seeing only the outcome or answer, as well as the value of teaching for problem solving technique and instructional activity management such as searching and experimenting and discussion in classroom rather than focusing on the explanation for students to memorize the content; an importance and acceptance in each

student's competency and potentiality rather than viewing it as the problem of individual differences and valuing each student's thinking technique as well as teamwork; an open mind for accepting others' critique and approaches differing from one's own. These were the new value developments which should be supported and encouraged to occur in the Thai Classroom. It was a good start for changing and developing the students' learning process and process of professional development relevant to the guidelines of Thai Educational Reform.

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