

The role of key teachers in PMRI dissemination

Sutarto Hadi, Maarten Dolk, Ellen Zonneveld

Abstract

The demand for PMRI (Indonesian adaptation of realistic mathematics education) implementation in primary schools is high. The capacity of TEC (Teacher Education College) to support the implementation is limited. How to cope with the limited number of faculties staff is an important issue in the PMRI movement. This is the small history of how the role of key teachers was born. A key teacher is a highly motivated teacher who is a role model in the school if it comes to PMRI. A key teacher helps his/her colleagues in designing PMRI lessons, a key teacher is supportive, is teaching together with his/her collegus, can observe lessons and give feedback.

If we look at the 4 principles of dissemination of PMRI:

- bottom-up development;
- learning through modelling;
- ownership in the right place;
- co-creating,

key teachers can be very useful and are of great importance in the dissemination. Using key teachers in the school has now become a more regular fact. To understand how it works we need to explain how teachers work on their professional development.

Teachers have a forum where they can meet regularly, that is called KKG: *Kelompok Kerja Guru* (literally translated: teacher working group). KKG's are teacher cluster meetings that are regularly organized among schools in a sub district. The purpose of this regular meeting is to conduct teacher discussion on various matters related to schools' agenda, such as examination, PMRI, or issues that concern the teaching and/or learning process. For a long time KKG has become a model of teacher professional development in Indonesia.

This paper describes how teachers developed into the role of key teachers, what their role in the movement means, how key teachers work together with their KKG forum as a vehicle to disseminate PMRI in their own school.

Key words: realistic mathematics education, innovation implementation, teacher professional development.

A. Introduction

The concept of large scale educational reform project is important to learn for the country like Indonesia. In most cases, the successful of small scale program is fail when implemented in a large scale project. This might be caused by the complexity of problems to encounter with, such as the number of schools and teachers, and the area to be covered. However, this complexity might not be put under the table. You have to deal with this, except your program will not have any significant impact in practice.

One of the current innovation projects in Indonesia is the implementation of realistic mathematics education in primary education. This innovation has been introducing since 2001. The first initiation was started in 12 primary schools in three different cities in Java, namely Surabaya, Bandung, and Yogyakarta. This initiation was supported by 4 Teacher Education Colleges (TEC), namely UNESA Surabaya, UPI Bandung, USD and UNY in Yogyakarta. This trial out was conducted for grades 1 to 3. The formal implementation was begin a year later starting from grade 1. After 6 years since its first trial out, in 2007 there are 11 TECs involved, namely the first 4 TECs and UNJ Jakarta,

UNLAM Banjarmasin, UNSRI Palembang, UNP Padang, UNIMED Medan, UM Malang, and UNNES Semarang. The number of schools involved are 33 schools. So, after 6 years there only addition of 21 more schools, that is from 12 schools to 33 schools. This development might be considered very small compared to 120.000 primary schools across Indonesia with more or less 25 million students.

We need to find a model that is appropriate for innovation implementation for Indonesia. One of existing modes of professional development in Indonesia is KKG (Teacher Working Group). The deliberation about KKG may be begun with “schools cluster.” Schools cluster is a group of primary schools which consist of six to eight schools that located in a nearby area in a sub-district. The group has the same program and activities related to the deliberation of government policies in education. Each cluster has a key-school as a centre and several impacted-schools. It has a KKG as a forum for teachers regular meeting and a K3S as a forum for principal regular meeting.

The KKG is currently expected to be a medium for primary schools teacher professional development. Problems and obstacles encountered by teachers on their works could be discussed and solved in KKG meeting. Also, up to date and actual information on education may be disseminated through the meeting. KKG provides professional services for teachers in using their own schools capacities, teacher educators and society in the neighborhood of the schools. However, this model is considered has limited impact to improve teacher competencies. Research conducted by Hadi and Wiraatmaja (2007) revealed that teachers question the effectiveness of this activity due to lack of examples of good models of innovative teaching that resulted in the use of lecturing as the method of mathematics teaching.

B. History of key teacher

To understand key teachers we might mention the PKG project, that is the project to strengthen teachers’ competencies. It was the project that supported by UNDP (United Nation Development Program) which run from 1978 to 1984. The PKG project was continued with the support from the World Bank until the beginning of 2000.

In the PKG project there are several trainings. At national level there were training for supervisor and instructors. At provincial level there was training for key teachers. At district and school level there were training for teachers and regular meeting for subject-matter teachers (MGMP). Every instructor was responsible for delivering training for key teachers and monitoring the work of key teachers through regular visit to MGMP activities. While key teachers were responsible to conduct training for their fellow teachers in district level and organizing MGMP activities at schools. Up to present, the term of key teacher is remain used to refer teachers who is responsible to help their fellow teachers in educational innovation program.

C. PMRI Activities in Banjarmasin

PMRI dissemination in Banjarmasin is conducted under the support of local PMRI center at Lambung Mangkurat University (UNLAM). The center carries out several activities such as workshop and other training program for primary school teachers.

There are three main program conducted by local PMRI center at UNLAM, namely start-up workshop, follow-up workshop, and quality boost program. Between those programs there are several socialization and training programs that initiated by schools. One of the programs is the insertion of lesson study into KKG activities (LS-KKG).

1. PMRI Start-up workshop

The PMRI start-up workshop was conducted in two days on October 31 till November 1, 2007. The workshop was attended by more 80 participants that consisted of teachers and principals from 14 primary schools in Banjarmasin, and lecturers from several TECs. Most of the participants were teachers. Although the first PMRI workshop was conducted at the end 2007, several teachers are already familiar with PMRI as a result of their participation on PMRI workshop at national level since 2004. Those teachers are partly using PMRI in their mathematics teaching. They are assets for PMRI dissemination in Banjarmasin.

Since most of the participants of the start-up workshop are new in PMRI, the workshop is arranged to build their basic knowledge in PMRI. What and why PMRI need to be elaborated. The participants are also need to be given the background information on PMRI movement. During the workshop activities are designed to be more practical than theoretical in order to give real experience on PMRI lesson characteristics (Figure 1).



Figure 1: PMRI Start-up workshop is designed to be more practical than theoretical

The principals are also invited in the workshop with the purpose to rise their concern on mathematics teaching. It is important to have their commitment for supporting teachers if they want to use PMRI in their mathematics lesson.

It is fully realized that the schools can not go alone. The support from TEC is considered essential to ease the obstacle that could be faced in the implementation. The support from faculties staffs are central. The participation of lecturers in the workshop is aimed to build their knowledge on PMRI as well as on strategies for supporting teachers.

It is very strategic to lend teachers' hands to speed up the dissemination. During the workshop the potential teachers will be visible. These teachers usually are honest to acknowledge that there are problems in their mathematics lesson. They may consider that PMRI could be a good approach to solve the problems. They are very active during the workshop and positively appreciate each activity. At the end of the workshop schools need to make real plan for implementation. The TEC also need to make immediate response to schools that really want to try PMRI. The school visit can not be postponed for whatever reasons.

It is considered important to know what is needed by the teachers. Pre-workshop activities are directed to understand the obstacle that encounter by teachers in their mathematics lesson practices in schools. The team from local PMRI center at UNLAM with the support from Dutch consultants visit a partner school. The team observed a lesson conducted by a teacher. Reflection was made afterward. Since teachers will play a main role during the workshop, especially in demonstrating PMRI lesson, it is needed to be sure that the lesson will reflect the PMRI lesson. The lesson was designed collaboratively among teachers, lecturer and consultants.

During the workshop, the activities were arranged as much as possible to reflect PMRI lesson. One of the characteristics of PMRI is students active learning. For that reason, the workshop were running with hands on activities. The participants could experience a PMRI lesson (like giving contextual problem as starting point, group discussion, teachers and students interaction, summarizing the lesson at the end) during the workshop.

After-workshop activities were intended to help teachers utilize their knowledge they got in the workshop to the real situation. Faculty staffs and Dutch consultant visited a partner school and made team teaching in a mathematics lesson. While model teacher was doing lesson, fellow teachers did unobtrusive observation. Teachers got real experiences in this activity. PMRI lesson appeared to be visible in their eyes and not a strange approach.

2. PMRI follow-up workshop

The start-up workshop gave hope as well as fuzzle among teachers. They appreciated the workshop that give them a new vision of a good mathematics lesson. However, the two days workshop was not give ample knowledge and skills to be succeed in the class. Moreover, local PMRI center at UNLAM has limited staffs members. Faculty staffs at mathematics education department are only 18 with two of them are enrolling their PhD

overseas. The rest are very busy with their daily job at the department, especially teaching. Lecturers are rarely come to the schools. This situation is hinder effective collaboration between teachers and lecturers.

The above background drives us to find a strategic way. After start-up workshop several potential techers had been identified. Local PMRI center has made informal meeting with them. School visit are conducted, especially to the schools where the potential teachers are working. This close collaboration are assest for the next steps of PMRI dissemination in Banjarmasin.

The follow-up workshop is designed with purpose to utilizing several potential teachers, later on called key-teachers to borrow the term that already used in KKG. The main concept of this workshop is teachers working with teachers (Figure 2). In the workshop it is expected that the ‘old’ schools will be fostered, while the ‘new’ schools make a real plan for implemenation. Key-teachers are expected to be leaders in their schools cluster. The workshop is aimed to strengthen teachers’ knowledge on PMRI, prepare new teachers on PMRI lesson, gain principals’ commitment for implementation, and lecturers’ support to teachers.

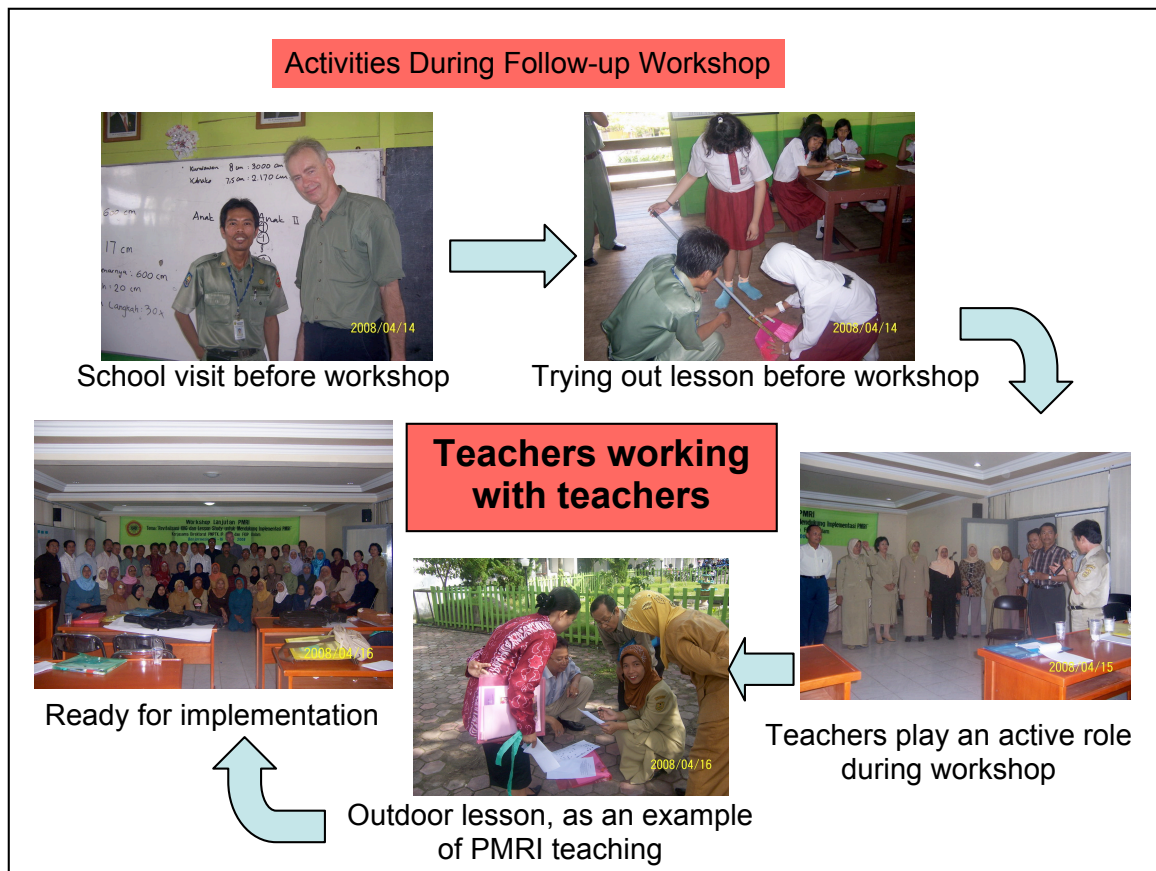


Figure 2: Activities during follow-up workshop: key teachers working with their fellow teachers

The follow-up workshop was held in two days on April 15 and 16, 2008. The workshop was attended by 72 people consisted of teachers and principals from 14 primary schools in Banjarmasin, and lecturers from mathematics education department UNLAM.

Pre-workshop activities were school visit and lesson observation. A key teacher tried out the PMRI lesson while observed by lecturers, a Dutch consultant, and other teachers. After the lesson, the tripartite team (teachers, lecturers and Dutch consultant) held preparation for the workshop. The main concern in the heads of the team was to revitalize the KKG as a vehicle to disseminate PMRI that run and organized by teachers mostly independently (with least support from lecturers). The team agreed on the use of lesson study model to be inserted in KKG meeting. So, participants need to be informed on the concept of lesson study.

In the workshop a session was devoted for lesson study. The other sessions were facilitated by key-teachers. They demonstrated models of PMRI teaching on several topics on mathematics in intertwined (thematics) modes for both lower and upper grades. The model of PMRI lesson for the upper grade was outdoor mathematics on ‘looking for treasury.’ For the lower grade another key-teachers demonstrated lesson on basic shapes of geometry. She conducted a real lesson with 15 students invited from a school. Both models of PMRI lesson were interesting. Another key-teacher shared his experiences in implementing PMRI in the school. (see Table 1).

Table 1 The program of PMRI follow-up workshop

Tuesday, April 15, 2008		
Time	Program	PIC
08.00 – 08.30	Registration	Organizing committee
08.30 – 09.00	Opening	Organizing committee
09.00 – 09.30	Coffee break	
09.30 – 10.45	Revitalization of KKG-LS to support implementation of PMRI	SH
10.45 – 12.00	PMRI teaching model on “Pencerminan” (Symmetry)	MYZ
12.00 – 13.30	Luch break and Midday praying	
13.30 – 14.45	Various models of mathematics teaching and learning	ZCh
14.45 – 15.15	Coffee break	
15.15 – 16.30	Model in action	ZCh
Wednesday, April 16, 2008		
08.30 – 09.45	Outdoor mathematics “Looking for treasury”	MYZ
09.45 -10.15	Coffee break	
10.15 – 11.30	Outdoor mathematics “Looking for treasury” (continued)	MYZ
11.30 – 12.45	Demonstration of PMRI teaching: basic geometry shapes (Grade 1)	NL
12.45 – 13.30	Lunch break and Midday praying	
13.30 – 14.45	Experience of PMRI implementation in school	HN
14.45 – 15.15	Coffee break	
15.15 – 16.30	Making action plan for implementation	SH
16.30 – 17.00	Closing + group photo	

At the end of the workshop participants made a real plan for implementation. It seemed that they were ready to make a significant change in their respective schools.

3. The follow-up of PMRI follow-up workshop

As a follow-up of the PMRI follow-up workshop, a cluster schools from Central Banjarmasin sub-district conducted a socialization workshop to insert lesson study in KKG (LS-KKG). This program was held on May 28 and 29, 2008 attended by 51 teachers, principals and supervisor. The main goal of the LS-KKG is to develop mathematics teachers competencies and professionalism using the lesson study model. In this program, teachers from a KKG group was invited to join the lesson study. They planned the lesson in collaborative atmosphere. A teacher tried out the planed lesson, while other techers observed. After the lesson they conducted reflection meeting. (Figure 3).

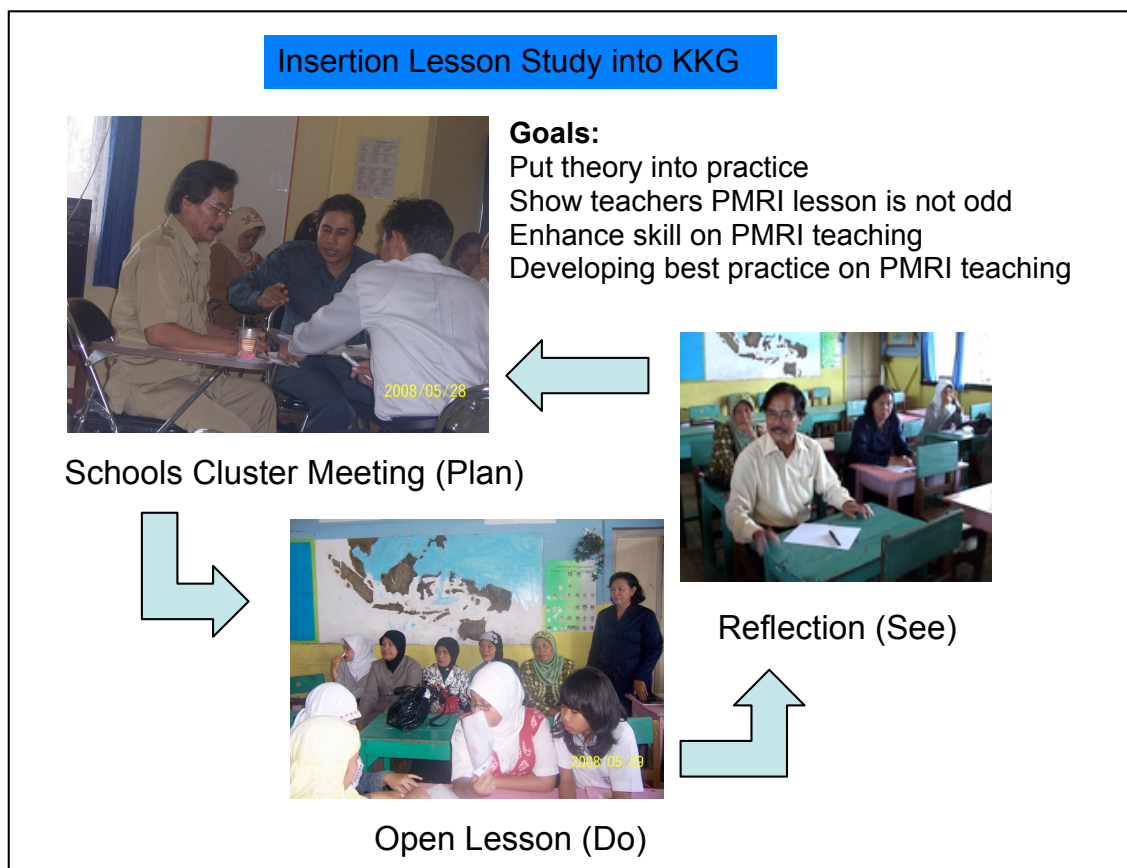


Figure 3: Lesson study activities in KKG to enhance effectiveness the schools cluster meeting

4. The quality boost program

The quality boost program is aimed to foster PMRI implementation in Banjarmasin. A group of key-tachers has substantial role. Their competencies need to be enhanced particularly in organizing LS-KKG (Figure 4). By this intervention we expect:

1. teachers independently and continuously could increase their professionalism through LS-KKG;
2. mathematics teachers can develop interesting lesson which is enjoyable and trigger children potential and creativity;
3. the increasing of students' achievement in mathematics as result of the use of PMRI approach.

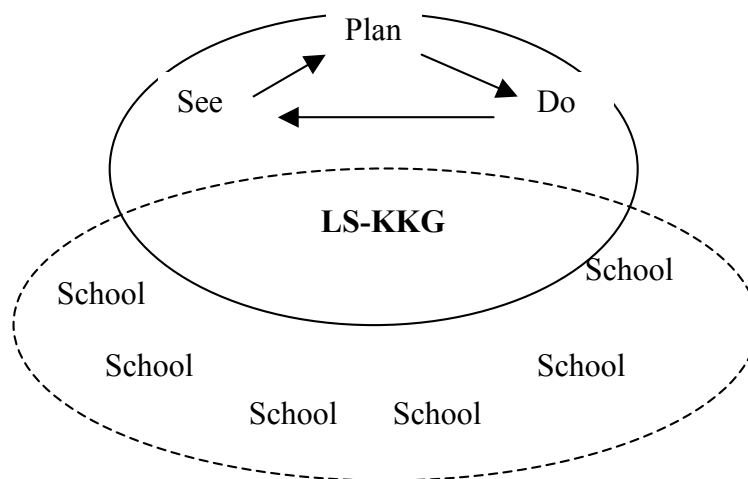


Figure 4: The model of insertion lesson study into KKG (LS-KKG)

Only a limited number of potential teachers were invited in the program. They were four key-teachers from four primary schools. The four key-teachers were asked to invited respectively 2 teachers from their schools, one lower grade and one upper grade teachers. In total there were 22 participants including lecturers and prospective student teachers. The program was held in five days from November 10 to 14, 2008.

The program was designed similar to the cyclic processes of lesson study that consisted of lesson design (plan), open lesson (do), and reflection (see). In the program the participants were divided into four groups. Each group made a design of lesson for lower and upper grades. The lessons were tried out in in two schools. Reflection was held after each lesson.

D. Conclusion

The PMRI program in Banjarmasin has contributed to two aspects, i.e. on mathematics teacher professional development and to speed up PMRI implementation in Banjarmasin. Teachers professional development is an important study in education. Especially in the effort to improve teachers' competencies as part of educational quality improvement program. Joyce and Showers (1995) mentioned that the improvement of students' achievement is started through the improvement of staffs. Furthermore, innovation implementation is a complex process since its related to changing of teachers' belief, implementation of new teaching, and the use of new materials (Fullan, 2001). The change usually is percieved by teachers with resistant (Hall and Hord, 2006).

Training and workshop are two common methods to improve teachers' competencies. However, these approaches are perceived ineffective, because oftenly after the training program teachers back to old way of teaching. The impact of the training is becoming more and more less effective in a large scale innovation intervention. Because the more teachers involved the more difficult to control and help teachers in the daily basis. Educational developers usually face dilemma between quality and quantity, that is to guard the quality of intervention with limited covered or to disseminate the innovation fastly with a large number of teachers but disobey the quality of intervention.

The insertion of lesson study into KKG is a model of teachers professional development. This is an interpretation of the concept teachers working with teachers (from teachers, by teachers, for teachers) . In this model teachers directly implement the theories they learned in the workshop in the lesson practices. By experiencing and observing the lesson directly in the classroom in the real setting, teachers realize that PMRI lesson is not a strange approach and feasible to be implemented in schools. Furthermore, by following LS-KKG, teachers' competencies on PMRI were improved. If the program could be conducted continuously we might expect the collection of best practices of PMRI teaching.

At the moment, PMRI has been spread up to others districts in South Kalimantan province. It is possible because the role of key-teachers. Last June 2009, LPMP South Kalimantan conducted five days technical assistance workshop on developing test items for school leaving examination. The program was attended by 100 teachers from all districts in South Kalimantan. Interestingly, PMRI key-teachers were asked to be facilitators in the program. They inserted the concepts of PMRI in their sessions. Because the participants knew that key-teachers play role in PMRI dissemination in Banjarmasin, they asked them to explain about PMRI. So, the last day was shifted to be the workshop on PMRI. This is only an example on how PMRI could be disseminated through the hands of key-teachers.

E. References

- Fullan, M. (2001). *The new meaning of educational change*. New York: Teacher College Press.
- Hadi, S. & Wiraatmaja, I. Gt. Ng. (2007). *Teacher professional development through schools cluster meeting*. Paper presented at the Second International Conference on Science and Mathematics Education (CoSMEd) 2007, Penang, Malaysia.
- Hall, G.E., & Hord, S.M. (2001). *Implementing Change: Patterns, Principles, and Potholes*. Massachusetts: Allys and Bacon.
- Joyce, B., & Showers, B. (1995). *Students Achievement Throug Staffs Development: Fundamental of School Renewal* (2nd Ed.), New York: Longman.