

**Promoting Mathematics Teacher Collaboration through Lesson Study:  
What Can We Learn from Two Countries' Experience?**

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**Abstract** In Australia, the Lesson Study Project is an on-going statewide government secondary schools initiative conducted by the Professional Support and Curriculum Directorate of the New South Wales Department of Education and Training. It began in 2001, and continues to function in spite of the withdrawal of support by the government at the end of 2004. In Malaysia, Lesson Study has just been implemented in two secondary schools since June 2004.

This paper aims to share with the conference participants our experiences of conducting the Lesson Study Process in two countries: Malaysia and Australia. It seeks to highlight the challenges, constraints and the modifications made as a result of differing cultural contexts. During the presentation, some video segments of the process within the classrooms of both countries will be displayed to give a better insight into the Lesson Study process. We also hope to reflect together with the conference participants on the possibility of implementing Lesson Study within their own countries.

**Introduction**

The *Lesson Study* process is a Japanese model of school based teacher professional development program that focuses on an examination of teachers' pedagogical practice either through direct classroom observation or through research lessons and case studies. It assumes that teacher learning and development will be more meaningful and effective if it is embedded in their everyday work, or in that of their colleagues. The core of the *Lesson Study* program involved teachers working on focus lessons, a process which was natural, useful and easily sustainable by teachers. The program provided a comfortable forum for teachers to challenge ideas about their practice and the content that they taught. Although the *Lesson Study* program was originated in Japan (Stigler, & Hiebert, 1999), it has manifested itself in various forms according to cultural contextual differences in countries such as USA (Fernandez, 2000), Australia (White & Southwell, 2003 a, b), and Malaysia (Chiew & Lim, 2003).

The two key features of Lesson study are: (i) peer observation of classroom teaching which "enhances pedagogical knowledge and skills through peer's review, critique, and collaboration" (Shimahara, 1998, p.456); and (ii) reflective practice which offers a process for improving teachers' own instructional strategies (Fernandez and Yoshida, 2001).

**The New South Wales Lesson Study Program**

The New South Wales (NSW) Department of Education and Training in conjunction with the Australian Quality Teaching Program (QTP) initiated a trial project called *Lesson Study*. It quickly grew from an initial three suburban secondary schools in 2001 to over two hundred secondary schools from across the state by the end of 2004.

The NSW *Lesson Study* model of professional development was designed to assist mathematics teachers to produce quality lesson plans while gaining a better understanding of student learning

in mathematics across the secondary school Years 7 to 12. Twice a year, schools would volunteer for a six-month program through their District Mathematics Consultant. The successful school teams were funded for the six months in order to obtain casual relief teachers and to purchase resources. A project officer was assigned to coordinate the project. This officer organized an introduction session to the program, provided some written material and resources and maintained a web site available to all governmental secondary schools. This helped schools to share their work and to further publicize the program. Though funding for a continuation of the project was stopped at end of 2004, the lesson study program has continued to be used in these schools (White, 2004).

The NSW process involved a small group of teachers under the coordination of an elected team leader, and not the whole of the mathematics staff. They met regularly (1-2 periods per week) to plan, design, implement, evaluate and refine lessons for a unit of work that they had selected. The process encouraged classroom observation by team members where one member would present the lesson while the others monitored student learning. Casual teachers were employed if needed to allow this process to happen. The team would then meet again and after a process of reflection and refinement, another member of the team would present the lesson with the others observing. Generally after a further period of reflection and refinement, the resulting lessons were written up and circulated. In some schools, however, a third and some times a fourth cycle were completed before the report was written. The team could invite outside experts if they so desired and sometimes other colleagues who were not part of the team would also observe the lessons.

#### **A Snapshot of a large regional country secondary school in NSW**

This regional country secondary school is situated in a large country town. The school population consists of approximately 1100 students drawn mainly from within the town but with approximately 20% of students traveling from the surrounding farming district. It is a year 7-12 school with all students housed on the one site. The mathematics secondary staff is composed of eleven teachers and one Head Teacher. As the Head Teacher was on leave, the Lesson Study team leader was the acting Head Teacher. The age of the staff members ranged from 30's through late 50's. The school attracts very few young teachers.

During the initial interview with the team leader, she described her staff as hard working and concerned about their students' welfare. However she faced particular difficulties in getting all her staff to become involved fully in the program. She was also concerned with one member of the team who was having difficulties with classroom management. She thought that members of the team could become upset and defensive with any critical feedback.

At the end of the program, the leader stated that the Lesson Study program was a success. She listed the strengths as:

- Firstly, that observing others teach was interesting and informative. This process assisted the member who was having management problems as the focus was upon the preparation and lesson structure which was the root cause of the classroom management difficulties;
- Secondly, having the opportunity to plan lessons that were 'hands-on' and practical, and which the students loved and demanded more; and
- Thirdly, the dropping of the defensive walls by the teachers. The initial uncomfortable feelings had passed. The staff could see the program was non-threatening and focused on the students learning and not upon the teacher. Even the children asked "are you checking up on us?" and were quite impressed when told that the purpose was to improve the lesson and to help them learn.

The rest of the staff was interested but remained aloof and only responded to direct requests. She plans to run another program in the following year and she is hopeful that the momentum and motivation will increase and the others will also become actively involved.

### **The Lesson Study Project in Malaysia**

The School of Educational Studies of University Science Malaysia initiated a *Lesson Study Research Project* in June 2004 at two secondary schools in a district at Northern Malaysia. It aims to evaluate the implementation of the Lesson Study process as a professional development program for mathematics teachers.

Two schools, situated in the same semi-urban district, volunteered to participate after we approached their school administrators. The first school has eight mathematics teachers involved while the second one has six of them.

To begin with, all the mathematics teachers, their head of department and the deputy principal of both schools were invited to attend a Lesson study workshop. During the workshop, we explained the principles and the objectives of the Lesson study group. We also invited an Australian expert in Lesson study to demonstrate how lesson study was carried out in 81 schools of New South Wales, Australia. The video demonstration was aimed to give an initial experience to the teachers of the lesson study process.

#### ***A Snapshot of Lesson Study at the Two Secondary Schools***

School S is an ordinary secondary school located in a rural area. The school has approximately 1300 students and it is a single session school from 7.30am till 2.00pm. Upon receiving the directive to conduct Lesson Study from the school principal, the Senior Teacher of Science and Mathematics led her team of eight mathematics teachers to engage in a Lesson Study session after the school teaching hours. The school timetable was re-arranged to allow the participants to meet regularly (once a week) from 1.00pm till 3.00pm. Throughout the one-year duration of the research project, the participants managed to complete three cycles of Lesson Study. During an interview with the team leader, she disclosed that some participants who were reluctant at the initial stage began to change their attitudes in the 2<sup>nd</sup> cycle of Lesson Study. She believed that the teachers concerned might have realized the benefits of such practices after the 1<sup>st</sup> cycle of the Lesson Study process.

School K is located within the town vicinity and the students are academically selected. The school has about 1200 students and comprised of two school sessions; morning and afternoon. For the morning session, it begins at 7.30am and ends at 2.00pm while for the afternoon session, it begins at 1.20pm and ends at 6.30pm. The principal of School A instructed the Senior Teacher of Science and Mathematics to coordinate the Lesson Study research project with the researchers but she delegated the task to the Panel Head of Mathematics as the team leader. The participants recruited were seven mathematics teachers; four morning session teachers and three afternoon session teachers. As two school sessions of teachers were involved, the school timetable was re-arranged to enable the participants to meet regularly (once a week) from 12.45pm till 2.45pm. Two cycles of Lesson Study were completed within the stipulated duration of the research project. For the 1<sup>st</sup> cycle of Lesson Study, one morning session teacher did not participate while in the 2<sup>nd</sup> cycle, the three afternoon teachers withdrew from the research project.

#### **Challenges and constraints that we faced**

Comparatively, the NSW lesson study project received more positive response than the Malaysian project as revealed by White (2004) where a total of 24 schools (64% of respondents) continued to use the Lesson Study program to develop their staff without outside funding and

after the official project had ended. Nevertheless, the Malaysian project has just ended at the time of writing this paper. We are yet to observe the sustainability of the process. In the mean time, below are several common challenges and constraints that we faced:

a) time constraint

Project schools of both countries reported time as the major constraint. Organizational changes were being made to allow meetings to occur during the school day and to facilitate classroom observation. However, in the Malaysian case, even though both schools allocated two hours a week for the Lesson Study session, several planned sessions were postponed or cancelled because some participants were unable to attend due to various circumstances such as attending workshop or staff meeting. As a result, the research project outcome differed due to the different level of staff commitment.

b) Teachers' attitude and commitment

The success or failure of the lesson study process is greatly influenced by the attitude and commitment of the participating teachers. We observed that for the NSW case, the participants recruited were mostly voluntary and this affected their commitment. Where participants had been coerced by their Head teacher of mathematics, generally they did not make the same personal investment as the others. While those who formed voluntary teams were not only highly successful, but by their enthusiasm and as a result they gradually enticed the rest of the staff to become involved.

In contrast, the participants recruited in the Malaysian project were largely instructed by their principals. Thus, the differences in the administrative and leadership support and encouragement reflected the commitment of the teachers. In school S where the principal and the head of mathematics department were very supportive and keen about the lesson study project, there was a strong commitment among the teachers. Even though three out of the eight mathematics teachers were not very keen at the beginning of the first cycle, their attitudes have changed to be much more positive and committed during the second cycle. Whereas in school K, where the principal only viewed the whole process merely as another university research project, several of the participating teachers were absent most of the time during discussion and class observation. This pattern of frequent absence caused some discussion sessions to be postponed or cancelled. Consequently, school K only managed to carry out two cycles instead of the targeted four cycles of Lesson study. During the second cycle, the three participating afternoon session mathematics teachers withdrew themselves. When the team leader of School K was interviewed, she revealed her difficulties in getting cooperation and commitment from the afternoon session teachers. However, when the participants who had withdrawn were interviewed, they acknowledged that Lesson Study process could benefit them in the long run. Yet, they felt, with their existing workload in the school, was too great a burden to continue their participation.

### **Our reflections and suggestions**

Despite the above challenges and constraints, the Lesson Study research project participants of both NSW and Malaysia have expressed positive feedback. From the group and individual interviews conducted at the end of the research, the participants listed the strengths of the Lesson Study process as follows:

a) Through group discussions and observing other teachers teach, they gained and enhanced both their mathematics content knowledge as well as pedagogical knowledge.

b) Upon self reflection and advice from colleagues who observed their teaching, the participants

were able to rectify their own teaching errors. Novice teachers, especially have the opportunity to improve themselves by observing and learning from the experienced colleagues the skills and techniques in teaching various concepts of mathematics.

c) Lesson Study promotes a collaborative culture that enhances the professional collegial bonds within their mathematics staff

d) Lesson study is a valuable professional development program. It was observed that participants have regarded the Lesson Study sessions as the venue to solve their teaching problems, and to develop their professional knowledge of mathematics teaching and learning.

Nevertheless, based upon our reflection on the research projects, the Malaysian researchers recommend the following approach should be taken to ensure the effectiveness of the Lesson Study process:

i) The Lesson Study program be monitored and supervised by the Senior Teacher of Science and Mathematics, and supported by the school administrator.

ii) School mathematics teachers be divided into smaller group (3-4 teachers) to allow greater flexibility of time; group according to grade level (such as lower secondary) to reduce the constraint of time, teachers' specialization and logistic.

iii) A network of mathematics teachers be created within the district to share, learn and collaborate within the context of Lesson Study.

### **Conclusion**

This paper attempts to examine the differing experiences of carrying out Lesson Study in two countries. We observed similar difficulties, mainly time constraint and teachers' commitment. Yet, the difference in attitude towards Lesson Study project: voluntary versus 'instructed' has affected the success or failure of the research outcome. Nevertheless, the Lesson Study process remains a potential valuable professional development program for mathematics teachers as espoused very positively by many of the teacher participants.

As a result of the Lesson Study process teachers reported a change in the nature of the staff-room discourse with a greater focus upon the Study Lessons and alternative teaching strategies, and a lot more sharing of ideas. As a result of this change in staff room discourse, they felt greater support by their colleagues. Thus, the Lesson Study process by providing a meaningful context for non-threatening lesson observation, also promoted greater collaboration and sharing within the team and with the wider mathematics staff.

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