

LESSON STUDY REPORT

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Select a group of teachers – who are they, how did you select them and why?

Stepanek et al. (2007) stated that a lesson study is “a professional development practice in which teachers come together to collaboratively plan a lesson” (p.1). I always saw the importance to improve teaching and learning by deepening subject knowledge, developing effective instructional strategies and thinking deeply about engaging all students in mathematics. I believe that lesson study is a great opportunity and effective way for educators to learn about larger issues that affect teaching and learning.

Sometimes sharing your work and materials is not an easy task. I decided to work with my colleague JoAnn Azzopardi because we have a good working relationship with each other. Our relationship as Bezzina (2013) argued is developed through “caring, listening, trust, honesty and collaboration” with each other (p.4).

Once we agreed to work together, we proposed the lesson study to the other mathematics colleagues in our school and identified teachers who were willing us to help out or who were willing to observe our lesson. As Stepanek et al. (2007) argued, it is important to “clearly outline each member’s role and responsibilities” (p.3). This was done by sending an open invitation email to our mathematics colleagues and other colleagues. Although some of them showed interested and were willing to engage with us, time was a really huge obstacle to create a schedule for weekly meetings so that every member could attend.

Since my colleague and I teach different year groups, a request was done to the other teachers who would like to offer his/her class for the second trial of the lesson. Most teachers saw the importance of lesson study and were very eager to help out by allowing one of us to teach their class. We kept those interested teachers updated with our lesson plan and quite a number of teachers were committed to observe the research lesson and debrief.

The initial meeting – how did you conduct this?

In our initial meeting, my colleague and I started discussing and planning an inquiry task that offers opportunities for differentiated teaching and that could easily be solved both all students irrespective of attainment level. We identified a problem that addresses most of the students' difficulties and focused on a task where students make connections between various areas in mathematics. As Fujii (2016) stated, the first step in the lesson study process is to identify a question, which becomes the research theme for the lesson study.

Initially, I felt somewhat confused especially when we were discussing a task to achieve our aim that of making mathematical connections. Having a syllabus and the Maths textbooks, I feel that sometimes we as educators are caught teaching directly from the textbooks and that learning is connected only for the sake of the exam. In fact as Stepanek et al. (2007) outlined, the lesson study gives the opportunity for teachers to “stop and focus on their practice rather than simply get caught up in the flow of teaching” (p.1). However, though our mathematics textbooks and syllabi must serve as guidelines, as educators we must be professional enough to develop our teaching and learning. Watanabe et al. (2008) argued that educators “must keep in mind that their responsibility is not to teach the textbooks, but rather to teach mathematics with textbooks” (p.134). Although I always try to be innovative in my teaching style, initially I considered it as a challenging task for me to design an inquiry-based task. Through collaboration and communication, I felt more at ease and confident to work collaboratively so that we present a suitable task that students enjoy working on.

We also took into consideration issues such as designing a task which is a real-life one, that appeals to the students and that is not too easy for the students. In fact we attempted to present a problem that interested our students and that can be applied to real world, thus making mathematics more meaningful. Consequently this motivated our students to engage with the problem and stimulated them to consider the mathematical thinking they have engaged in.

Selecting what to teach, what class to teach and when to teach the lesson.

My colleague and I teach different year groups and have different timetables as previously discussed. Since the lesson study involves cycles of planning, implementation and evaluation, we discussed that one of us will teach the lesson with one group and the other will re-teach the lesson to another group keeping in mind that both classes will be following the same track. The importance of re-teaching the lesson is to refine our pedagogical teaching and strategies while focusing on students' learning. Stepanek et al. (2007) argued that the best way to start is to decide "*who* will teach the lesson to insure that everyone is invested in the creation of the lesson plan" (p.5). I must admit that here I encountered the biggest challenge, that is, to select a year group that I would take over another teacher to re-teach the lesson due to timetable constraints.

The choice of the selected year group, that is, Year 9 Track 3, depended on the remaining topics to be covered before the Half Yearly examination since our lesson was planned to be taught in mid-January. My colleague and I identified a task which would serve as an effective revision of various topics before the Half Yearly examination as well as give the students the opportunity to delve into new areas. Our aim was to design a task where students are given the opportunity to connect various mathematical areas tackled during different years of schooling. This would help the students to become aware of "a concise and efficient way to represent computation processes" (Watanabe et al., 2008, p.137) since they become more aware of similar methods that can be worked out more efficiently.

Before choosing the task, my colleague and I gathered a range of materials on the research theme. We looked at syllabi, textbooks and online journals to gather information about different ways the research theme could be organized and presented. We got our idea for the task from one of the mathematics textbooks. While denoting the remaining topics, I reflected on the topics that I find most challenging to teach and students find difficult to understand, as well as common errors that students used to struggle with.

We started our lesson study by reviewing students' prior knowledge in preparation for exposure to the new material. I tried to get into the students' shoes to fully comprehend the

students' difficulties. Watanabe, Takahashi & Yoshida (2008) argued that "teachers should actually solve the potential problems and/or engage in the learning activities themselves" (p.136). Although I always kept the mathematical focus as one of my priorities, I gave the importance of designing a task that accommodates differentiated teaching and learning styles.

When deciding to present the problem, I also kept in mind the importance of anticipating students' responses. We tried to predict students' difficulties and discussed how to reduce students' confusion by presenting a concise task. We also thought carefully about the numeric values used in a task because I strongly believe that this can strongly influence students' ways of solving the task and will eventually help us teachers to make sure that the goal of the lesson will be reached.

The lesson planning process

The lesson planning process was quite a demanding part since it entails the use of efficient lesson timing, resources to be used, classroom organisation, the lesson phases, discussing the possible methods available to work the task, and so on. We also designed observation sheets to collect data about student learning. It required a lot of time, and I would not have been able to plan all this on my own. Hence in order to engage in the lesson study I felt that it was crucial to find time to meet with my colleague on a regular basis.

In planning this lesson, we attempted to incorporate the eight principles of mathematics teaching practices that research indicates need to be consistent components of every mathematics lesson (NCTM, 2014). For instance teachers must engage students in problem solving and discuss tasks that promote mathematical reasoning. Effective teaching of mathematics engages students in making connections among different areas in mathematics to deepen understanding. Teachers must also make use of purposeful questions to assess and elevate students' way of thinking.

When planning our whole class discussion, I felt that the *neriage* phase (the plenary) was the most challenging to handle in our lesson study. I felt that it is important to offer students

opportunities to share, discuss and reflect upon their work. However, as an educator it was also imperative to provide 'just-in-time' interventions to scaffold students' learning. Although we presented a set of questions that would serve as a starting point to our discussion, it was important to add on and extend students' knowledge.

Since the task could be worked through the use of a variety of methods, it was a learning experience for me to see how such a seemingly easy task, which could easily be worked out by a primary school student, offers great possibilities for discussion and could be extended to include a variety of methods such as simultaneous equations and functions which are tackled towards the end of secondary schooling.

Teaching the lesson

In our first attempt to teach the lesson, I was an observer. The observation was really eye-opening. The first thing I noticed was how difficult it was for me to focus on the students and not on the teacher. The observers' role is to probe closely the way pupils react, how effectively they learn and make progress and how well the design of the lesson meets pupils' needs and engages them in learning.

It was vital that the teacher tries to stick to the lesson plan, as much as possible, because "the lesson is the result of the collective wisdom of the team" (Stepanek et al., 2007, p.7). All the teachers who were involved in the lesson plan worked collaboratively with each other to design a meaningful and relevant task and went beyond the minimum requirements of delivering the curriculum. This was done so that ultimately students engage themselves during the lesson. Since the task presented was based on a real-life situation, students seemed that they tried to link mathematics to its usage in the real world while making it more meaningful. The Think-Pair-Share approach used in the lesson helped to maximise students' participation as well as students gave their maximum attention on the problem and seemed engaged in the understanding the material given by the teacher. I believe that this approach is a collaborative learning strategy which makes the teaching and learning process more active. While students were presenting their work, I noticed that the use of the poster was a creative and effective means by which students can showcase their work.

I think the ultimate goal of teaching is to do just that – teach, not stand up in the front of the room and explain the mathematical content to be learned. The teacher is there to provide the required support and advice as well as the necessary scaffolding and teaching of skills when necessary.

While teaching the lesson, the teacher used effective questioning, fostered reasoning and stimulated students to communicate and articulate their thoughts and ideas. However, I feel that every now and then it is useful to stop and reflect on how my levels of engagement, enthusiasm and passion for teaching, can make a difference to the engagement, and ultimately the academic outcomes, of my students.

The lesson study debriefing

Lesson debriefing should serve as a platform for all the team involved in the lesson study to share their views and opinions. As a team, we tackled every phase of the lesson one at a time. Then we evaluated what worked and what needs to be adjusted, and what has been learned about the pedagogical approaches used. A number of issues emerged from the data collected through the observation sheets. Time was really a huge obstacle in our lesson. It was also noted by some observers as they clearly stated “maybe more time was needed” and another observer mentioned that the lesson “took longer than a lesson”. Then we decided to adjust the lesson timing as well to eliminate some of the methods’ flashcards that the students are not aware of yet so that students do not get confused when deciding to select the appropriate method name. On the other hand, there was quite a number of positive aspects. The lesson study seemed that it was a positive learning experience for all the students. Some of the observers highlighted the following positive aspects:

- *While some of the students were more active in the discussion than others, they all were, more or less, engaged in the task.*
- *Lesson was very interesting, not usual lesson.*
- *All group members worked and contributed and showed motivation.*
- *Students seem to enjoying the lesson.*

- *A very positive lesson... Improvements were suggested by students themselves and explained clearly.*
- *Interesting activity and very well planned. The majority of the students contributed equally in their groups. Objective of the lesson was successfully reached.*
- *Student participation and enthusiasm in presenting results, proof of lesson success.*

I felt that while carrying out our lesson debriefing I gave my importance to focus on the students' learning and whether the lesson is effective, not on the teacher and her teaching. This was possibly done by looking in depth at the teacher's feelings and experiences of conducting this lesson, as well as study the observers' and students' views through the collected data or observational field notes. We also discussed the students' reactions and responses in each phase and whether the aim of the lesson was reached. The students' experiences, engagement and learning were very crucial in our discussion.

The lesson was then revised and it was my turn to re-teach the lesson to a different group of students. It was a positive experience re-teaching the lesson. It was highly evident that each student understood the task presented and all managed to come up with more than one method to solve the problem. Most of the resources presented were a great aid for the students to solve the task. I felt that to take over another teacher's class would not be an easy task. In fact, it was my biggest challenge while re-teaching the lesson as I did not know the students well.

Following each lesson, students were asked to write and reflect on what they learned during the lesson. All students reported enjoying the lesson study experience. Most of them emphasized that different topics can be used to solve a single problem.

Benefits and challenges of integrating lesson study in your school

I believe that a lesson study is a powerful, professional learning tool that helps educators to improve teaching and learning. It is an opportunity to develop "a common language and a shared vision for the school of effective teaching techniques, helping to drive whole school

improvement” (IRIS Connect, 2016). Educators become lifelong learners and start to think about school as a whole instead of only their own class.

Lesson study offers an innovative way of planning and delivering a lesson. I felt that our team had a great opportunity to plan, collaborate, discuss and reflect on our practices. Although at first I might considered lesson study as a daunting task which requires a lot of extra work, I admit that lesson study is not about being original or creating an exemplary lesson. It entails to create engaging lessons. For instance, teachers may use the existing resources and fit into the normal continuum of lessons for that class. Lesson study can help teachers shift their teaching approach from “teaching as telling” to “teaching for understanding” (Lewis, 2000).

Every member involved in lesson study can benefit and thus teaching and learning can flourish. Teachers’ learning during lesson study can vary starting from development of knowledge, changes in interpersonal relationships among teachers and advance of personal qualities and dispositions (Lewis, 2009). Lesson study helps educators see teaching from various points of views. As a teacher, I felt that I had more time to spend on students’ thinking. The lesson study cycle seemed to support development of content knowledge among us teachers. All the teachers anticipated what tools, methods, possible solutions and common errors that students might frequently encounter. We had the opportunity to gain insights from other teachers and a keener appreciation of each other’s strengths and needs. Through this lesson study, we, mathematics teachers managed to create a community that contribute to our own professional growth. Another benefit of the lesson study is to create a shared vision among us teachers. Most of the mathematics teachers who participated in this lesson study aimed to achieve the same goal. We urged students to learn to explain their thought process rather than to give the final answer when solving a task. Thus, I felt that it was a great opportunity to discuss issues about what vision of mathematics we want our students to embrace.

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