



## Implementing Lesson Study in Middle Schools: Benefits and Challenges

**Ali Abdella**   
Seattle Public Schools, United States of America

**Chris Reddy**   
Stellenbosch University, South Africa

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Ali Abdella, Chris Reddy

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### Abstract

Lesson study (LS) as teacher development strategy has received a great deal of attention from researchers and teachers alike. It involves teachers' collaboratively planning lessons, observing lessons, and then discussing their observations of the teaching and learning process. The study in question is part of a larger project that explored the implementation of LS in three middle schools in Eritrea. Semi-structured interviews and participants' reflective reports were used to generate data during the different phases of LS. By drawing on the qualitative data, the study identified factors that supported or hindered the implementation of LS in Eritrea. LS enhanced the content and pedagogical knowledge, observation skills, collaboration, confidence and motivation of teachers. It also enhanced student learning. However, challenges such as lack of time, the novelty (newness) of LS and a resource-poor context posed a threat to teachers' participation in LS. Given the benefits identified, this study advises policymakers in Eritrea to consider plans that would promote the use of LS as school-based teacher development strategy in all school districts nationally.

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### Introduction

The 2002 concept paper developed by the government and the Ministry of Education especially was intended to guide the reform of education in Eritrea. In terms of this policy, the reform aims to a) produce well-rounded citizens who could compete in the global economy; b) make education employment oriented; c) raise the quality of education to internationally acceptable standards; and d) abolish all wastage of personnel, resources, efforts and time (Ministry of Education, 2002). This reform is broad and far reaching and will require much effort at all levels of the education system.

Teachers form an important part of all education reform initiatives at school level. This requires teachers to play key roles in the implementation of educational reform (Fullan, 2007) and thus to make adjustments and additions to their normal practices. To implement the reform initiatives listed above, teachers in Eritrea were expected to incorporate interactive pedagogy into their classrooms (Ministry of Education, 2002). To enable successful implementation of the policy proposed in 2002, planning for the professional development of teachers has become a topic of discussion in the Eritrean education context. An important argument raised was that in order to implement the reform objectives and bring about changes in classroom instruction, it is imperative that teachers in Eritrea be provided with professional support. In the Eritrean context, teacher support is essential because of the discrepancy between what teachers are accustomed to and the demands placed on

them in terms of the reform initiatives. Many international studies have shown that investing in teacher development improves instruction, which in turn raises student achievement (Hill, Rowan, & Ball, 2005; Baumert, et al., 2010; Voss, Kunter, & Baumert, 2011).

In order to meet the aims of the reform, the Ministry of Education organized teacher development opportunities, usually in the form of workshops, short-term orientations and training of trainer programs. These opportunities were few and often organized in a top-down fashion whereby experts provided reports and ideas on best practices from a deficit perspective, meaning that teachers lacked something (Feiman-Nemser, 2001). There is a consensus that such approaches produce little change in classrooms (Feiman-Nemser, 2001; Loucks-Horsley, Stiles, Mundry, Love, & Hewson, 2010) as they are isolated from school and classroom realities and rarely involve teachers in the planning processes (Guskey, 2000). As a result, teachers often do not take such programs seriously and often continue with approaches that are familiar to them (Lee, 2008).

It is accepted as conventional wisdom that if teacher professional development opportunities are linked to the actual classroom practices of teachers, these opportunities could make a difference and contribute to professional development. One such option that links professional development to classroom realities is using LS (Hiebert, Gallimore, & Stigler, 2002). Stigler and Hiebert (1999) and Murata (2011) have suggested five features of LS that contribute to its effectiveness, namely being collaborative, being a reflective process, being a long-term and continuous process, focussing on improvement of classroom practice and focussing on student learning. In keeping with the above five features, this study reports on a process of implementation of LS in selected middle schools in Eritrea. The report focuses on teachers' experiences, addressing the following two questions:

- 1) What are the positive experiences of teachers regarding LS?
- 2) What challenges did the teachers identify in the use of LS?

In this article, we present the LS process report in five sections. The first part provides an overview of LS and its benefits and challenges. The second part describes the context of the study, the participants and the data generation method. The third part highlights the data analysis. The fourth part deals with data presentation and discussion. The last part provides concluding comments and recommendations.

## **Lesson Study**

LS, a well-established, classroom-based and collaborative form of teacher development activity that was first used in Japan (Lewis, Perry, & Hurd, 2009; Lewis & Tsuchida, 1998; Stigler & Hiebert, 1999). LS is a cyclical process in which groups of teachers spend considerable amounts of time on planning, teaching, observing and discussing and then on improving the teaching of a lesson (Fernandez, 2002; Lewis, 2002a). During these processes, teachers focus on how best to teach lessons in order to facilitate and enhance student thinking and learning (Lewis, Perry, & Hurd, 2009).

The process starts with groups of teachers deciding on a lesson(s) from a curriculum unit that they want to teach. Such a lesson is known as a research lesson (Chokshi & Fernandez, 2005; Lewis, 2002a, b; Murata, 2011), and unlike ordinary lessons, it is jointly planned by a team of teachers (Lewis, 2000; Lewis & Tsuchida, 1998). Teams typically consist of three to six teachers who select suitable topics that would best serve their students' learning (Lewis, 2002b). The group may also include at least one knowledgeable other who would guide the teachers through the LS process (Stepanek, Appel, Leong, Mangan, & Mitchell, 2007; Fernandez, 2002).

During the development process, the team of teachers collaboratively prepares a detailed lesson plan that includes anticipating students' thinking and learning (Lewis, Perry, & Hurd, 2004). One teacher teaches the research lesson while the others observe and gather data that might be used for improving the lesson. This is followed by the arrangement of a reflection meeting in order to discuss the weaknesses and strengths of the lesson and to make suggestions for improvement of the lesson presentation (Lewis, 2002b; Morales, Mercado, Palisoc, Palomar, Avilla, Sarmiento, Butron & Ayuste, 2021). If the team decides to revise and improve aspects of the lesson, a different member would teach the revised lesson to another group of students, often followed by observation and reflection (Lewis, 2002b) as described above. The whole process is summarized in Figure 1.

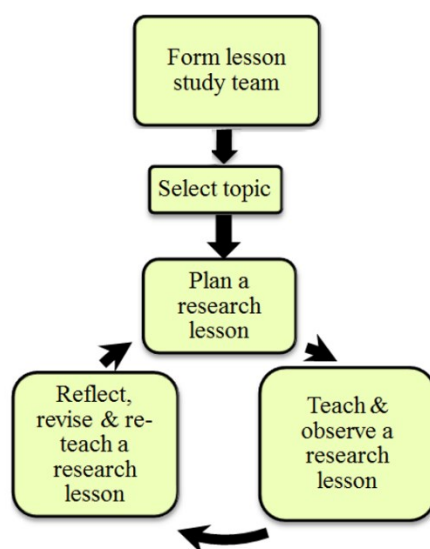


Figure 1. LS Stages

In 1999, a book by Stigler and Hiebert, namely *The teaching gap: Best ideas from the world's teachers for improving education in the classroom*, introduced LS to countries outside of Japan. Subsequently, there has been evidence of growing interest in and application of LS to bring about positive changes in classroom practices. For example, LS has been trialled in the United States of America (Chokshi & Fernandez, 2004; Fernandez, 2002; Lewis, 2002a, b; Lewis, Perry, & Hurd, 2004; Puchner & Taylor, 2006). According to Lewis and Tsuchida (1998) and Rock and Wilson (2005), teachers were able to improve their teaching, build on their content knowledge, learn from one another and share professional knowledge during LS. LS has also been trialled in Australia (Doig, Groves, & Fujii, 2011), Canada (Chassels & Melville, 2009), Greece (Kanellopoulou & Maria, 2019), Hong Kong (Lee, 2008), Indonesia (Saito, Hawe, & Hadiprawiroc, 2008), Israel (Robinson &

Leikin, 2012), Norway (Juhler, 2018), the Netherlands (Verhoef, Coenders, Pieters, Van Smaalen, & Tall, 2014), Singapore (Chong & Kong, 2012; Lim, Lee, Saito, & Haron, 2011; Tan-Chia, Fang, & Ang, 2013), South Africa (Coe, Carl, & Frick, 2010; Ono & Ferreira, 2010; Posthuma, 2012), Taiwan (Juang, Liu, & Chan, 2008) and the United Kingdom (Cajkler, Wood, Norton, & Pedder, 2014; Norwich & Ylonen, 2013). All the authors referenced indicate similar positive improvements in teaching practices. A model with decades of history in Chinese education has recently evolved into LS and contributed to improving classroom practices in that country (Chen & Yang, 2013). In the context of Eritrea, this study is the first of its kind that used LS as a teacher development strategy in selected middle schools to investigate its potential benefits and challenges as experienced by teachers implementing the approach.

### **Benefits of Lesson Study**

We extracted five benefits of LS from the literature reviewed. Firstly, according to Stigler and Hiebert (1999), LS seemingly helps teachers to build content knowledge and improve their pedagogical knowledge. Fernandez (2002) and Hiebert et al. (2002) suggest that by providing a platform for collaboration, LS enables teachers to share the experiences that they have during the LS process with the other members of the team, thus enabling collaboration as an integral part of the process. Secondly, LS enables teachers to develop and sharpen their observation skills. When one teacher in the team teaches a lesson, the others observe it to collect relevant data that would help in analysis and improvement of the lesson. Lewis (2002b) indicates that collecting data in this way also helps teachers to refine their observation skills. Thirdly, LS enables teachers to establish strong interpersonal relationships. As indicated earlier, it creates a platform for collaborative practices (Lawrence & Chong, 2010), improves teachers' collegiality (Puchner & Taylor, 2006) and builds a community of practicing teachers (Wenger, 1998) who are willing to share ideas and resources (Lewis et al., 2004). The interpersonal relationships built during LS are usually extended beyond the research lessons (Lewis et al., 2004) and can include a variety of other academic and personal interactions. Fourthly, LS leads to improved quality of lesson plans (Lewis, 2002b). The refined and revised lesson plans and reports serve as a source of knowledge (Hiebert et al., 2002; Stigler & Hiebert, 1999) to all involved in the process. Finally, LS can break the culture of isolation by eliminating the feelings of loneliness experienced by teachers. It helps teachers to develop a sense of belonging to a professional community (Cajkler et al., 2014; Chokshi & Fernandez, 2005; Wenger, 1998), which serves as an important support mechanism in the often lonely and private practice of teaching.

### **Challenges of Lesson Study**

Three challenges of LS were observed during our review of the literature. Firstly, teachers who participate in LS think that they lack an adequate understanding of the LS process (Chokshi & Fernandez, 2004). Secondly, teachers are apprehensive about conducting public lessons, having become accustomed to working in isolation and privately. This is partly also because classroom observations are traditionally linked to performance evaluation and many teachers consider LS as a replacement for teachers' performance evaluation (Chokshi & Fernandez, 2004). Finally, teachers experience time constraints for doing LS (Chokshi & Fernandez, 2004). Chokshi and Fernandez suggest that this problem could be averted if teachers used their time effectively by

assigning roles to group members, distributing materials for feedback beforehand, writing the lesson plan outside the group meetings and avoiding lengthy discussions by focusing on a few key points. Lee (2008) also emphasizes the role of school leadership in creating time for teachers to participate in LS, which could ensure the success of the process.

## **Methods**

### **Research Design**

This was a qualitative research process that was conducted within an interpretive research paradigm (Yin, 1984). The aim of the research was to understand the experiences of teachers involved in the LS process in terms of the constraints and benefits of the LS process. It was structured as a case study spread across three separate middle schools, each constituting a case (Stake, 1995). According to Yin, a case study is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context” (Yin, 1984, p. 23). The phenomena investigated in this study were science teachers’ perceptions of and experiences with LS, specifically what promoted and what hindered the LS process in selected middle schools in Eritrea. As there is strong government control over education in the country, the contexts of the schools are largely uniform, as indicated below.

### **Context of the Study and Sampling**

This study was conducted in Zoba Maekel School District in Eritrea at three middle schools located within close travelling distance. At least three willing science teachers were selected from each school to participate in the study. Each school formed a case, and a team was formed from a group of three to six science teachers at each school. A total of 15 teachers from the three schools were part of the process. Having small numbers of schools and participants partake in the process allowed the researchers to investigate the cases thoroughly. The school directors and pedagogic heads who agreed to participate in the study provided logistic support to the teams.

In order to comply with research ethics, certain procedures were followed at the start of the study. Participants signed a written consent after they had been informed of the aim and purpose of the study, the nature of study, the commitments involved in the study and that they could withdraw from the research at any stage. In order to ensure the anonymity of the participants and their schools, pseudonyms were used for the schools and codes for the teachers. The schools were named ‘School A’, ‘School B’ and ‘School C’. The teachers in each school were named ‘T1’, ‘T2’, ‘T3’, ‘T4’, ‘T5’ and ‘T6’. The school directors and pedagogic heads were named ‘D’ and ‘PH’, respectively. Four of the teachers were females and 11 were males, and the directors and pedagogic heads were males. The work experience of the participants ranged from 2 to 43 years. In School B, the participants were qualified to teach at their required level. In schools A and C, however, two-thirds of the teachers were not certified to teach in middle schools. Willing science teachers were identified and approached to participate in the study. In School A, six from a total of thirteen science teachers were selected for the study. In School B, six from a total of seven science teachers participated. In School C, there were only three science teachers and all of them were willing to participate.

## Lesson Study Training

Participants identified for the study attended training workshops related to the LS process. The introductory and follow-up workshops acquainted participants with the concepts underlying LS through a PowerPoint presentation and a demonstration of the process using video clips, as suggested by Joyce and Showers (2002). The videos were downloaded from the websites <https://www.collaborativeclassroom.org> and <https://www.youtube.com/watch?v=0xgko79kO94>. During these workshops, printed handouts on LS were provided to all the participants as resource materials. The concluding workshop provided the participants with opportunities to reflect on their actions by way of discussions in the respective small groups and in the full group of participants.

The introductory and follow-up workshops were followed by the participants' implementing LS in their respective schools for one academic year. They worked collaboratively to select suitable topics, plan, teach and observe, discuss, revise and reteach research lessons, incorporating ideas that they believed could improve the lessons, as discussed by Lewis (2002a, b) and Fernandez (2002). The underlying thinking was that through attending the training workshops and implementing LS in their classrooms, teachers would develop their personal, social and professional skills (Bell & Gilbert, 1996) and in turn would improve their classroom practices (Murata, Lewis, & Perry, 2004; Lewis, 2009).

The school directors and pedagogic heads participated in the study to create supportive school environments (Joyce & Showers, 2002). In addition to the role of researcher, the first author supported the participants by acting as knowledgeable other, which entailed training the participants and guiding them through the phases of LS (Stepanek et al., 2007). The duration of the process and the structure and components of the training workshops are summarized in Table 1.

Table 1. Duration, Structure and Components of Training

Duration	Structure	Components
First semester (23 Feb – 29 Jun 2013)	Introductory workshop	Theory presentation Demonstration of LS skills
	Practicing of LS	Practice of LS Guidance and support Establishment of a supportive school environment Support from knowledgeable other
Second semester (2 Sep – 31 Dec 2013)	Follow-up workshop	Theory presentation Demonstration of LS skills
	Practicing of LS	Practice of LS Guidance and support Establishment of a supportive school environment Support from knowledgeable-other
End of the project	Concluding workshop	Thanking and issuing of certificates of participation

## **Data Collection**

After the training workshops, the teachers implemented LS in their respective schools for duration of one academic year, during which they taught five to six research lessons. Focus group interviews were the main instruments employed to generate data. Through these interviews, the researchers obtained detailed information that reflected the views and perceptions of the participants.

Three group interviews, namely H1, H2 and H3, were conducted with the teachers at different stages while one group interview (J) was conducted with the school directors and pedagogic heads. In addition, the participants were requested to report their views and experiences at different stages of LS, namely during observation of research lessons, after discussion sessions and at the end of each LS cycle, in formats designed to generate data, namely F, L and G, respectively. The transcribed interviews and the data obtained through the three formats formed the material for data analysis.

During data presentation and analysis, verbatim extracts were used together with descriptive texts to illuminate the findings from which themes were developed in terms of the work of Braun and Clarke (2006). To indicate the source, abbreviated names of the schools, the participants and the instruments were used in sequence. For example, in SAT1-H3, SA stands for School A, T1 stands for the first teacher in the school and H3 indicates that the source of the data is the third group interview. In SAT2-G1, SA stands for School A, T2 stands for the second teacher and G1 indicates data generated at the end of the LS cycle. In SBT2-L5, SB stands for School B, T2 stands for the second teacher and L5 stands for data generated during the discussion session of the fifth lesson. In SCPH-J, SC stands for School C, PH stands for the pedagogic head and J stands for data from the director and pedagogic head group interview. These codes assisted with data management and secure storage and helped the analysis process as well as comparison of data to eventually develop the key themes related to the research questions.

Appropriate measures were taken to ensure credibility and trustworthiness while conducting the research and reporting on the findings. Quality was ensured through prolonged engagement at the study site, triangulation, collection of referential adequacy materials, description of context and peer debriefing (Guba, 1981; Lincoln & Guba, 1985; Merriam, 1998; Mertens, 1998).

## **Data Analysis**

An inductive process was used to analyze the data and explore the participants' experiences of LS, as described by Auerbach and Silverstein (2003), Charmaz (2000), Strauss (1987) and Strauss and Corbin (1990). The process of data analysis started by repeatedly reading the content of the transcripts, breaking them down into segments and then categorizing the segments into higher order concepts, keeping the research questions in mind. The categories that answer the two research questions, namely benefits gained and challenges encountered, are reported in this paper.



## Results and Discussion

The analyzed results reveal that LS offers several benefits as a teaching planning and implementation process. The results also demonstrate some of the constraints that hindered participation of the teachers in LS. Both categories/themes are discussed in the section below.

### Benefits of Lesson Study

In relation to benefits, six themes emerged in the process of analysis, namely teachers' content knowledge, teachers' pedagogical knowledge, teachers' observation skills, teachers' collaboration, teachers' confidence and motivation, and students' learning.

#### *Teachers' Content Knowledge*

Although the gains might vary based on individual teachers' backgrounds and commitments, the teachers mostly reported that participating in LS had improved their content knowledge. The collaborative nature of LS also enabled them to share ideas and learn from one another. This is illustrated by the excerpts/quotes from the data, such as the following:

“LS helped me to have deep knowledge about the subject matter” (SAT3-G3), “I read several books in order to prepare for the lessons. That enhanced my understanding” and “Even though I was teaching electric circuit to my students every year, I did not have a clear idea about it. I was able to clearly understand and differentiate between series and parallel circuits after SBT1 taught it” (SAB2-H2).

These findings resonate with similar findings reported in the literature, in which the collaborative planning, teaching, observing, revising and re-teaching of lessons used during LS are reported to have improved the content knowledge of teachers involved in the process (Fernandez, 2002; Rock & Wilson, 2005). LS allowed the participants to engage in active discussion and reflection and offered the context for the teachers to read more widely in their subject and to look for alternative resources in order to plan effective lessons, which in turn enhanced their content knowledge.

#### *Teachers' Pedagogical Knowledge*

Consistent with the literature, the teachers in this study held deeply rooted beliefs about teaching (Stigler & Hiebert, 1999). Their contextual constraints such as heavy workload, large class sizes and pressure of content coverage challenged the implementing of student-centered lessons. However, the data in this study suggests that after participating in LS, the teachers frequently used student-centered and interactive pedagogy in their classrooms. The data from the focus group interviews indicates that the teachers believed that participating in LS enhanced their pedagogical skills, teaching methods, lesson planning skills and frequency of utilizing teaching-learning resources that encouraged learner-centered activities. Given the contexts mentioned above, the

teachers planned and used interactive pedagogy that provided hands-on experience to their students and shifted their role from providers of information to facilitators of learning. They demonstrated this by organizing activities that satisfied an array of student needs. For example, SAT1-H2 explained the changes in his/her pedagogical knowledge as follows:

“Having subject matter knowledge alone does not make an effective teacher. To be effective, a teacher should be equipped with skills necessary for teaching. When teachers observe other teachers’ lesson, they borrow or learn new skills from them.”

Other respondents noted that LS encouraged her/him to focus on learning rather than teaching (SCT3-H1):

“After participating in LS, I started focusing on learning than teaching. I started giving hands-on and problem-solving activities. Students were given chances to observe themselves. Now, I am taking a facilitator role by allowing students to participate in the learning process” (SAT3-G3).

The participants perceived changes in their lesson planning skills. They indicated that before participating in LS, they spent less time on planning and thus prepared sketchy lesson plans. After participating in LS, however, they took planning seriously and spent more time on discussing and preparing detailed lesson plans that focused on ‘how’ rather than ‘what’ students should learn. The participants indicated their satisfaction with collaborative planning, and they also liked the simplicity of the new lesson plan format that they were required to use during LS. This can be illustrated by quotes such as the following:

“I am preparing a detailed lesson plan in collaboration with other teachers” (SAT3-G3) and “... we were able to prepare effective lesson plans” (SCT2-H3).

The participants commented on the frequency of using hands-on materials. Prior to their participation in LS, they paid less attention to using teaching-learning resources because they were either expensive or difficult to prepare. The teachers felt discouraged about preparing teaching aids because many of them were wasted due to lack of storage space at the schools. Given these contextual constraints, the participants often used teaching-learning resources in their lessons. They improvised teaching aids from readily available materials, requested their students to bring them or used their environment, such as the school garden, as a source. They claimed that using hands-on activities enhanced students’ learning and boosted their interest in science. A respondent mentioned,

“In the old days, we would not take extra pain to collect all these materials. We would simply continue our teaching by abandoning the demonstration altogether” (SAT1-H1).

Another respondent indicated how she/he used her/his environment as resource:

“... we have started using teaching-learning resources in our lessons ... we brought flowers from a flower garden located at the back yard of our school. We have never remembered this garden before ... we also instructed our students to come to the lesson with flowers” (SBT1-H2).

In summary, in each LS cycle, the participants focused on how their students learnt. They used this information to make changes to the research lessons, which enabled them to see improvement in student learning and their own pedagogical knowledge. This finding regarding the progression of teachers’ personal development is supported by Bell and Gilbert (1996). In line with the findings by Bell and Gilbert (1996), teachers in this study first identified deficiencies in their lesson planning and in the use of teaching materials. They then collaboratively designed lessons that addressed the problems identified and, finally, indicated their satisfaction with the new teaching strategies when they were able to see their own growth as teachers.

#### *Teachers’ Observation Skills*

Observation is an important component of LS as it provides important data for discussion and review. As shared by the respondents, LS enabled them to observe one another and helped them to improve their lesson observation skills.

“We got an opportunity to observe lessons of one another” (SCT2-H2) and “I have developed my observation skills and able to explain what I have observed” (SBT2-G2).

Another respondent (SAT4-H1) reported that she/he had learnt to focus on students’ learning rather than on evaluation of the performance of teachers:

“I have never focused my observation to what students were doing. After participating in LS, I started looking at students’ learning. I started observing what they are doing and what they are saying.

This practice of focusing on students’ learning enabled the teachers to carry out their classroom observations with less stress.

A participant stated that focusing on students’ learning permitted her/him to observe behaviors that she/he had never noticed before. As a result, the participant had to plan and discuss how to address the issues. As a participant mentioned,

“I have never thought about creation of subgroups. After providing a task to a group of students, we were assuming that all students are discussing the matter as a single entity. However, that was not the case. Some of the students formed subgroups i.e. a small group within a group. Now, I have learned that it is important to ... go around the class in order to avoid formation of subgroups” (SAT5-H1).

The majority of the respondents indicated that focusing on students' learning helped them to gain new insights into how to improve their classroom practice, as corroborated by Lenski and Caskey (2009). The data revealed that when teachers observed one another, they had opportunities to reflect on their own teaching (Lewis, 2002a; Morales et al., 2021), a practice that characterizes LS and makes it an effective school-based teacher professional development strategy (Hiebert et al., 2002).

### *Teachers' Collaboration*

The results of this study reveal that participants had a sense that they always worked in isolation with limited professional dialogue, collaboration and peer observation. There was no culture that encouraged and supported collaboration in their schools. Identifying isolation as a problem is the first step in the social development of teachers (Bell & Gilbert, 1996). The participants noted that LS had removed the barriers prohibiting them from working together. As a respondent indicated,

“LS enabled me to work with colleagues collaboratively, teach a lesson collaboratively and be able to observe how a teacher teaches a lesson and how students learn it” (SAT2-G3).

Another respondent echoed a similar sentiment:

“I can say that the barriers that were blocking teachers from collaborating with one another or working in teams have been removed. These barriers were the negative feelings that the teachers were holding regarding being observed, the fear of being evaluated, or the fear of being belittled by colleagues” (SBT6-H3).

Generally, the participants expressed positive feelings towards the joint lesson planning because they were able to prepare better lessons together than individually. As a participant shared,

“Two or more heads are better than one head. Therefore, collaborative work is more productive than individual work” (SAB5-H2).

Another respondent indicated,

“Planning collaboratively is better than planning individually, because one can obtain support from colleagues on difficult topics. Thus, prepare better lesson plan” (SCT1-H2-00:03:27).

These ideas resonate with literature indicating that a joint planning process enhances teachers' collaboration (Matthews, Hlas, & Finken, 2009). Participating in LS seems to have the added benefit of enabling teachers to engage in open and rich professional dialogues around topic selection, lesson planning, the choice of teaching method, and the use of teaching-learning resources. In School B, the teachers indicated that working together helped them to better understand lessons that were difficult for them. They reported that working as a team

simplified their work as it enabled them to share ideas and have a common understanding about what to teach. As one of the respondents said,

“LS made the process of teaching and learning simple for the students to understand the concept. This means that LS simplified our work. ... we were planning as a team therefore our job was simplified” (SBT1-H2).

The teachers indicated that they enjoyed working together with their colleagues. Collaborative work strengthened their interpersonal relationships and helped them to come to know one another and network with one another. This is illustrated by quotes such as these:

“... consolidated our relationships” (SBT1-H2), “I have created friends” (SBT2-H3) and “Now, we are discussing on what to teach, what type of questions to include, discuss on the demonstration and agree on the experiment” (SAT4-H1).

This finding is supported in literature indicating that LS facilitates professional dialogues (Lewis, 2002b) and strengthens interpersonal relationships among teachers (Chokshi & Fernandez, 2004; Lewis, 2009; Murata, 2011). The findings of this research indicate that the participants valued collaboration with colleagues and that LS helped to break the isolation of the teachers and enhanced collegial relationships amongst them.

#### *Teachers' Confidence and Motivation*

The teachers reported that the collaborative planning, teaching and observing enabled them to support one another and contributed to increasing their confidence in teaching publicly observed lessons. For example, one of the respondents mentioned,

“Earlier when a teacher or a supervisor observes my lesson, I was losing confidence. Now I feel nothing. I am open to anybody to observe my lesson, because I have taught several research lessons” (SAT3-H3).

The teachers who participated in this study expressed their enthusiasm for participating in LS as they become aware of its benefits in enhancing teaching. As one participant indicated,

“... participating or working in collaboration with other teachers enhanced my motivation” (SBT5-H3).

Another respondent indicated her satisfaction for being the first in Eritrea to practice LS:

“I am very grateful for participating in LS. I am happy for getting this opportunity” (SAT5-H2).

The participants demonstrated their motivation and commitment by being punctual, by regularly showing up at all LS events and by being willing to teach revised lessons. During all LS events, the participants worked

collaboratively and shared ideas and resources with their colleagues. Indirectly, LS helped them to develop a sense of commitment and enhanced their enthusiasm, as indicated by Murata et al. (2004). It also cultivated a sense of belonging to a community (of practice), as indicated by Wenger (1998).

Besides internal motivation, some external factors influenced teachers' commitment to and participation in this study. A school director indicated that the stipends and the food served during the workshops motivated the teachers:

“... the stipends provided to cover for their transport costs. ... the tea and cookies ... served during the workshops, motivated the teachers. Usually, such types of incentives motivate teachers and should be encouraged” (SAD-J).

### *Students' Learning*

The participants indicated that they believed that LS enhanced the quality of learning experienced by their students. Since the lessons allowed active student engagement, the teachers claimed that LS enhanced student learning and enthusiasm in class. For example, a respondent indicated,

“The students were able to understand the lesson because the lesson was supported with chart and it was practical. They were able to understand the lesson because it was conducted in the form of discussion” (SBT2-L5).

Because they observed benefits for the students, the participants were enthusiastic to continue in the research:

“I would like to continue with LS” (SAT1-H2).

They also wished similar professional development for their colleagues, as indicated by a respondent:

“I recommend LS not only for teachers in one school, but also for teachers from many schools teaching the same subject” (SCT2-H1).

It does appear as though teachers were encouraged to continue with the LS process after observing an improvement in student focus and learning in science classes. It is always gratifying for teachers when they observe students who are happy to learn and when they get through to students with the concepts that they are teaching.

### **Challenges of Lesson Study**

The two main challenges that were identified in this research were limited time and a perceived lack of skills and resources.

*Limited Time*

The teachers reported a lack of time as the main challenge for their participation in LS. The participants reported that finding time for both lesson planning and meetings was difficult as they were busy with other academic activities. As a respondent shared,

“The only challenge that questioned LS was time. LS does not go with lack of time. It is time consuming. We spent a lot of time for planning and debriefing meetings” (SCT3-H2).

The teachers in this study found the meticulous planning required for every lesson difficult to include in their contexts. Similar situations were reported by Chokshi and Fernandez (2004). In addition to the time requirement inherent in LS, the teachers reported that the heavy workload and their personal commitments restricted the time that they could allocate to LS. Similar results were reported by Rock and Wilson (2005), who portray LS as a process that requires a substantial amount of time and commitment from the teachers.

While teachers considered a lack of time an obstacle, they demonstrated willingness and commitment to solve the problem. Many agreed to meet and work during their spare time, exchange periods with colleagues, borrow periods from colleagues and forgo some of their equally important personal commitments. Teachers who did not participate in LS were also willing to exchange periods with those who did participate. The school leadership supported the participating teachers by approving the changes and adapting the timetable as required. Some of the quotes illustrating such ideas are the following:

“We use free periods of the students or by cancelling some social functions such burial processions” (SAT3-H1), “The staff members were cooperative. When we request them to engage our classes, they were accepting our requests” (SBT2-H3) and “The school administration was helpful in arranging timetable” (SBT2-G3).

The time-consuming nature of LS and the high curriculum load slowed down the teachers’ progress in the project. A respondent shared that he/she was left behind by other science teachers in terms of completing the syllabus:

“We spent a lot of time in one unit, many weeks. With such pressure of completing the syllabus, one would focus on covering the syllabus than thinking about how students are learning. One cannot get time to think about student learning. One thing that does not go with LS is the extensiveness of the syllabus” (SAT2-H3).

The extra time required to work on the LS project presented difficulties in terms of the normal commitments to completing the curriculum content and other imperatives. The teachers in this project, however, persevered and worked through and beyond this barrier.

### *Lack of Skills and Resources*

LS was new to Eritrea, and the participants indicated that they lacked some of the basic skills and experiences required to engage meaningfully. Initially, they thought that the situation was tense because LS was new to all of them. They also lacked experience in areas such as collaborative work and peer observation. These perceptions were illustrated by quotes such as these:

“... we did not have the culture of observing lessons of one another, which we found it difficult in the beginning” (SBT1-H1), “... working and sharing ideas with colleagues was not common in our school” (SBT2-H1) and “Not having deep understanding about LS was another challenge” (SBT3-H1).

The challenge created by the novelty of LS was not limited to this study. It also proved difficult elsewhere, according to Taylor, Anderson, Meyer, Wagner and West (2005). Similarly, Chokshi and Fernandez (2004) identified that teachers who participated in LS for the first time found it difficult to shift from teaching in isolation to collegial planning, observations and reflections. The participants in this study, however, indicated that their concerns decreased as they taught more lessons and increased their knowledge and skills. As a respondent pointed out,

“Now, the newness ... has already been faded away. Meaning I will not feel stressed if others observe my lesson” (SBT1-H1).

The experiences of LS were also new to the students who were part of the project. Students who were accustomed to traditional teacher-centered teaching found it difficult to transition to the new approach that required them to be actively involved in some lessons. As a result, they needed additional direction and management. These experiences are illustrated by comments from participants such as these:

“The students have worried a little bit at the beginning, about the method of teaching we used. They had views like what we had at the beginning of LS. When things repeated the effect of newness disappeared” (SAT2-H2) and “Students required additional instructions, as it was new to them” (SBT2-H1).

Although teachers enjoyed LS, their busy schedules and curriculum overload constrained their ability to engage more robustly. Even though they did not identify any problems in the procedures, the novelty of LS challenged them and their students, especially during the earlier stages of the project.

## **Conclusion and Recommendations**

This section summarizes the findings, discusses the implications of the findings in the context of Eritrea and provides recommendations based on the data. The results of this study illustrate that teachers' content and pedagogical knowledge can be improved during LS processes. All the processes and interactions included in LS collectively contributed to teacher professional development in science teaching. LS required teachers in this



project to collaboratively plan, teach, observe and discuss lessons. The frequent use of teaching-learning resources and the meticulous lesson planning process served to enhance the pedagogical skills of teachers. Several studies indicate the connection between teacher knowledge and quality of instruction. Teachers equipped with content and pedagogical knowledge have been found to deliver quality instruction, which in turn has a positive impact on students' learning outcomes (Hill, et al., 2005; Baumert, et al., 2010; Voss, et al., 2011). Teachers who participated in this study were able to build their content knowledge and improve their teaching through peer collaboration, as corroborated in the literature (Lewis & Tsuchida, 1998; Rock & Wilson, 2005), which then translated into improved classroom practice, as noted by Lewis (2002b), which in turn can be inferred as professional development.

Prior to the introduction of LS, the teachers were working in isolation as there were no structures in the schools that supported collaboration. LS processes provided the opportunity for the teachers to work as a team. LS enabled them to engage in focused conversations and critical dialogues. It opened a space for teachers to engage in discussions, to share ideas and to reflect on their actions. The collaborative nature of LS promoted teachers' interpersonal relationship and enhanced their sense of belonging to a professional community, as noted by Wenger (1998).

The findings of this study further indicate that LS enhanced teachers' interest, motivation and confidence. They were able to control their own development by either choosing topics that contributed to their development and their students' learning or choosing topics that challenged them and were difficult to their students, as corroborated in the literature (Knowles, 1984). Furthermore, LS allowed teachers to focus on student learning. All lessons were organized in a student-centered way by encouraging students to discuss, ask questions, present and participate in hands-on activities. All these practices enhanced the participation and learning of students.

Notwithstanding the above benefits, this study revealed certain challenges that negatively affected teachers' participation in LS. Lack of time was an obstacle as LS is demanding and requires teachers' commitment to the process. Heavy workload (extensiveness of the syllabus) was also a constraining factor. The interplay of these factors impeded the smooth accomplishment of the LS process, but teachers carried on notwithstanding these barriers. Another challenge was the lack of skills to conduct LS in the Eritrean educational context. Teachers were not accustomed to collaborating with and observing the lessons of their colleagues or teaching in a learner-centered fashion. However, their attitude towards collaboration and observing colleagues changed over time and towards the end, the participants felt comfortable with LS and all that it entailed, even recommending LS to other teachers.

Based on the positive impact of LS on teachers' personal learning and classroom practices, this study recommends that LS be introduced in Eritrean schools as a viable professional development intervention to effectively bring teachers together to collaborate and jointly seek solutions to their pedagogical problems. Unlike the traditional teacher development approaches that are familiar to most teachers in Eritrean schools, LS is a teacher-directed and bottom-up democratic approach driven by teachers for teachers. If LS is implemented

in Eritrea, it would signify a major paradigm shift for teacher development that could benefit not only teachers but the education system as a whole.

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### Author Information

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**Ali Abdella**


 <https://orcid.org/0000-0001-9602-6050>

Seattle Public Schools

United States of America

Contact e-mail: [asabdella@seattleschools.org](mailto:asabdella@seattleschools.org)

**Chris Reddy**

 <https://orcid.org/0000-0002-6261-0600>

Stellenbosch University

South Africa