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Implementing Lesson Study to establish a Professional Learning Community and enhance Students' Learning

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Abstract

This action research was undertaken to explore how the execution of Lesson Study (LS) would promote a Professional Learning Community (PLC) and bring improvement in students' learning. Despite the introduction of a professional learning practice in the school, a vast majority of the teachers have remained isolated and hesitant to exchange teaching-related information and experiences, thus a strong need for a PLC was felt in the school. Therefore, to promote a PLC the practice of LS was introduced and studied in relation to students' learning. LS has gained rapid recognition in enhancing both teachers' performance and students' learning in recent years. There were 18 student and 4 teacher participants involved in the study. The data were gathered through test results, questionnaire surveys, and classroom observation. We completed three rounds of the intervention process in three months. In each round, the team had the opportunity to plan and apply different research lessons in their respective classes. After three months of the implementation process, the result showed improvement in the student's learning as well as in the promotion of the PLC of the school.

Keywords: Research lesson, lesson study, professional learning community, students' learning

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Introduction

Teacher professional learning is of growing significance as one way to support the increasingly complex skills students need to learn in preparation for further education and work in the 21st century. In turn, effective professional development (PD) is desired to aid the teachers to learn and refine the pedagogies required to teach students of varied backgrounds (McSweeney & Gardner, 2018). Teachers should have space to share ideas and collaborate in their learning. By working collaboratively, teachers can generate communities that positively change the culture and instruction of their entire school. This suggests that teachers' professional development must take into account the aspects of teacher competence and pedagogical skills, (Gunawan 2017). A teacher's roles and leadership in the instructional process is the determining aspect of the efficacy of teaching and learning in the classroom (Cerbrin & Kopp, 2006).

PLC is a team in which teachers have universal views on collaborating, sharing, reflecting, and the needs of their teaching and learning practice (Hord et al., 2009). So, to sustain effective PLC, LS seemed suitable and more practical as it involves the collaboration of actions to plan, implement instruction, identify weaknesses and then reflect on the processes before implementing changes and improvements. LS has been used for the professional development of teachers in Japan for more than a century, and it has also been commonly used for professional development since it was adopted in other parts of the world (Gunawan, 2017). The majority of studies include implementation of lesson study among in-service teachers that mostly reported on success stories. Therefore, in this action research, we implemented LS in humanities subjects to find out how LS would promote PLC and bring improvement in students' learning.

Research Question: How can we implement lesson study to promote professional learning community (PLC) and students' learning?

The aims and objectives of the study:

The general aim of the study was to find out the effectiveness of lesson study in establishing PLC in the school to improve the students' higher-order thinking skills.
The objectives are:

1. To explore the effectiveness of lesson study in improving teachers' practices.
2. To evaluate the impact of lesson study on students' learning.
3. To find the challenges of implementing Lesson Study in Bhutanese Context.

Reconnaissance

The researchers had the experience of doing conventional and as well as action research. Moreover, researchers attended a five-day workshop on Action Research conducted by the District Education Office, which supplemented the ideas and

experiences on the process of action research. Furthermore, the lead researcher attended a week-long training on LS from Thailand experts in the year 2018. During this, we learned the essence of LS and its process.

Situation analysis

During my 20 years of service as a teacher in Bhutan, I have witnessed a great number of changes in our education system. Regardless of the changes that the ministry has initiated to bring about a major impact on both teacher quality and student learning, a shortcoming observed amongst the teachers in Bhutan is that teaching is more of a private profession. I found that the teachers typically work alone and do not collaborate to plan and teach. There are very few occasions to conduct professional conversations with colleagues on teaching and learning. Hence, PLC in the school is not significantly developed.

Subsequently, the teachers hesitate to collaborate with colleagues while developing lessons, which hinders the teachers' ability to reflect and improve upon their classroom practices, resulting in the quality of student learning being compromised, (Dudley, 2014). In my current school, I have observed that the humanities subject teachers do not collaborate much on their teaching and learning practices.

Furthermore, after carrying out an item analysis for the mid-term examination 2021, I discovered that two sections of grade 7th and a section of grade 10th students have scored the minimum marks in terms of answering higher order level questions compared to other sections in the school. Therefore, to assist the Humanities Department Subject teachers to develop collaborative lessons and improving their reflection on their teaching practices, we decided to establish a PLC with the aid of LS in our school. The students of the above-mentioned sections who scored the minimum marks for higher order thinking skills (HOTS) questions were selected for the action research. With the aid of LS, we would create a PLC to address this issue. As LS has been acknowledged as a method for teachers to systematically improve their quality of teaching, (Marsigit, 2007). It has been proven to be an effective tool for the enhancement of teachers' professional development across the world. In Bhutan; no studies of such nature have been conducted.

What is Lesson Study?

Lesson Study is a staff development program that is introduced by Yoshida to develop 'kenkyujugyo' in Japan, which is called the 'Study of Teaching', (Cerbrin and Kopp, 2006). As the implementation leaves a significant impact on the quality of teachers and teaching, this concept has been accepted by other countries such as Singapore, Hong Kong, China, UK, US, Sweden, and Canada and has become a model to improve the quality of education and teaching (Gunawan 2017).

Lesson Study is a structured process where teachers work together to formulate solutions to challenges, they encounter in teaching and learning. In Japanese lessons, study teachers work in small teams to plan, teach, observe, analyze, and refine individual class lessons, called 'research lessons' (Gunawan , 2017).

The Lesson Study Cycle

First, student learning is essential in lesson study. Throughout the lesson study cycle, the teachers identify a few common targets for student learning, plan a lesson collaboratively by reviewing authentic curricula materials to make student learning noticeable in the classroom, gather the data through observation sheets during the lesson delivery and then discuss the student learning that occurred in the classroom later (Marsigit, 2007). Normally, teachers plan daily lessons to cover a particular amount of content, but in lesson study, everything circles student learning. The team creates a lesson intended to "bring the goals to life" (Teele, Maynard, and Marcoulides n.d.). It is key for the lesson study team to formulate a specific research question and pursue this throughout the process (McSweeney & Gardner, 2018).

Second, observation is significant in lesson study. Since lessons are planned in order to make student learning observable, all participants in the lesson study group focus their attention on observing students' learning. One team member teaches the lesson while others observe and collect evidence of student learning (Gunawan, 2017).

Third, a 'research lesson' indicates that the lesson aims at examining a certain problem related to the participating teachers' learning. The team discusses the results and assesses progress made toward learning goals. The group revises the lesson, repeating steps 2-4 as shown in Figure 1 below as necessary, and shares findings.

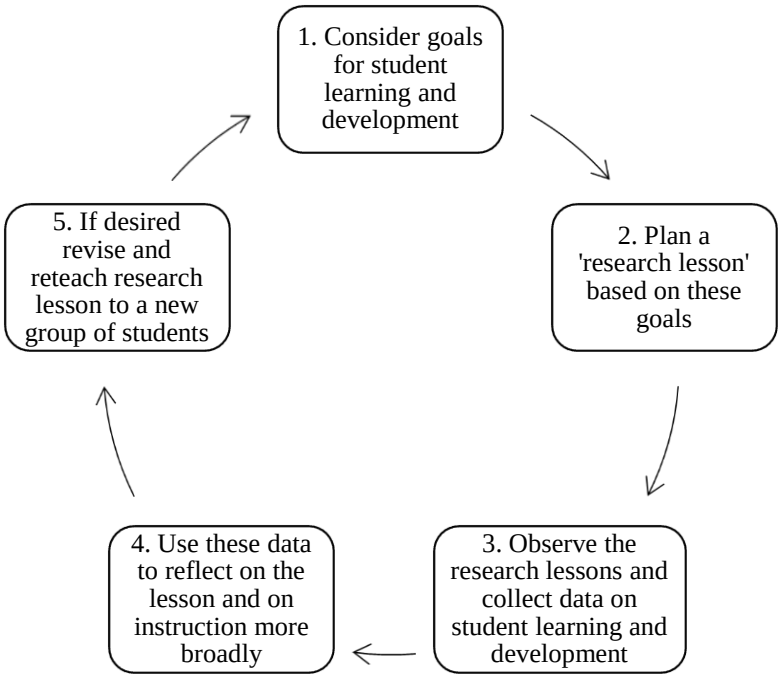

Figure 1. The lesson study cycle (Murata, 2011, p. 2)

Lesson Study's Impact on Teachers' Professional Development

A great number of studies concluded that the teachers' professional development can be enhanced with the aid of lesson study intervention. Teachers' learning patterns and their self-efficacy and performance measurement had increased besides improvement in their overall teaching competencies owing to the implementation of lesson study intervention, (McSweeney & Gardner, 2018; Schipper et al., 2017; Schipper et al., 2018; Vermunt et al., 2019). Vermunt et al. (2019) state that the lesson study intervention had provided the participant teachers with greater insights into the pedagogical knowledge by making them more aware of the educational needs of the students. Similarly, Cerbrin & Kopp (2006) found that collaboration via the lesson study created a forum where the teachers share ideas, be exposed to various perspectives, and develop activities related to the content. Marsigit (2007) argues in the Teaching Gap that lesson study provides a means to improve teaching and learning through the development of shared professional knowledge based on teaching. Likewise, a quasi-experimental study conducted by Schipper et al. (2018) found that the adaptive teaching competence of the participants in terms of the experimental group experienced a gradual increase after the implementation of the lesson study intervention when compared with the results of the control group.

McSweeney and Gardner (2018) claim that the lesson study intervention is a great tool for teachers to self-reflect and self-evaluate their performance fundamentally to upgrade their teaching competence. So, participation in lesson study can help teachers develop an 'inquiry stance' and become more reflective about their practice

(Gunawan, 2017). In addition, a study conducted by Kim et al. (2019) discovered that teachers could invent innovative teaching and learning strategies by cooperatively working together to meet the desired learning outcomes with the support of LS.

Lesson Study's effect on Students' Academic Performance

Recent studies have indicated that the lesson study intervention has improved students' academic performance besides the improvement of the teachers' competencies. Cerbrin & Kopp (2006) have found that there is a direct relationship between teachers' competence and students' academic performance. They stated that students tend to learn and do better when the teachers provide them with meaningful and interesting learning experiences with regard to chemistry. Further, Kim et al. (2019) highlight the fact that lesson study is an integral way to develop professionally for teachers, but she also pinpoints that the achievement of the students increases after the teachers take part in the LS process. Besides, a two-year-long study conducted by Gunawan (2017) highlights that there is a drastic increase in students' mean marks after the implementation of the second phase of the lesson study intervention as compared to the results of the pre-intervention test.

Likewise, Gunawan (2017) states that the student's academic performance can be increased and the gap in their achievement can be reduced with the aid of lesson study. Further, Marata (2011) asserts that LS can be a useful and effective approach to seeing student learning in detail as it happens, to observe the gaps between what teachers have assumed to occur when students learn and what occurs in the classroom. A majority of the studies support those students tend to perform better after the implementation of the lesson study intervention. Another study by Fernandez and Chokshi (2003) has illustrated that the lesson study had a positive impact on the students and increased their class participation and motivation in learning mathematics. Despite the advantages of lesson study interventions used to address the gap in learning and increase students' academic performance by enhancing the teachers' pedagogical knowledge, most of the earlier studies were conducted on science and mathematics-related topics. This study is inventive as it has been conducted to explore the impact of lesson study with respect to the social science subjects in the Bhutanese context.

Challenges of Implementing Lesson Study

Although the implementation of lesson study intervention is beneficial to both the students and teachers, there are a number of difficulties associated with it. For instance, Kim et al. (2019) identified; time constraints, implementation of teacher standards; content, and instructional support systems are a few of the challenges faced while implementing lesson study. Likewise, Gunawan (2017) identified lack of student and teacher readiness, not enough budget allocation, and time constraint as a few of the factors that affect the intervention. Schipper et al. (2017) have found that a strong

supportive management system is vital to provide a positive working environment and liberty to experiment with new ways of teaching. In the same way, we also expect to experience such challenges in our school while implementing LS such as time constraints and lack of readiness since the current teachers' workload is high. Marsigit (2007) states in their study that the teachers had experienced some level of difficulty in conducting learning activities in terms of students' participation while implementing the lesson study intervention, but the exact reason for that occurrence was not cited.

Professional Learning Community

The teachers in a Professional Learning Community share a common vision, with that vision in their minds they work collaboratively with cooperation and dedication in shaping the school towards that vision. The teachers in that community always exchange invaluable information related to teaching and learning via discussion, professional development courses, and debate (Ministry of Education, 2016).

Intervention Process

Item analysis for midterm examination

Item analysis for midterm examinations is done to analyze student responses to individual exam questions with the intention of evaluating exam quality. The item difficulty analysis for the midterm examination 2021 was conducted using the formula, who answered a question correctly / the total number of respondents x 100 for all the sections in the school. The higher the rate of difficulty the easier the question it indicates and vice versa. After, conducting the item analysis, we identified two sections of class 7 (A and B) with 32 students each and a section of class 10 (B) with 27 students as our area of study since they have the lowest difficulty rating for higher order thinking related questions.

Implementation of Lesson Study

Briefing on Lesson Study

A meeting was held with the teachers who agreed to participate in the action research. They were oriented on the concept of LS and its application. The teachers were asked to try and implement the process of LS with the assistance of the presenter to make them grasp the concept of LS.

I. Reflection

After the briefing, the teachers were asked to write a brief reflection on their lesson, teaching practices, students' learning, and other issues related to student learning for a week. The motive for the reflection is to identify the gaps in their practices and to transform students' knowledge.

II. Target Setting

After a week's duration, the teacher participants gathered once again for target setting. During the target setting the participants were asked to read each other's reflections and find out a few common gaps in their practices and a few common student learning issues. Thus, in our study, the common gap discovered in their teaching was implementing student-centered pedagogies. Additionally, the common student learning issue that they all were worried about was HOTS. HOTS questions are the questions that begin with the words such as evaluate, analyze and create which not only require the students to think beyond the four walls but also aid them in understanding the topics more vividly (Taram, 2017). HOTS are important aspects of the teaching and learning process to enable students to think critically and solve problems.

Lesson Plan Development

Based on the findings from their reflection, the teachers were then asked to search for relevant strategies to raise the level of HOTS in their students for about 2 days. After that, they gathered once again for a discussion on a collaborative lesson plan development. That although the participants suggested a number of strategies such as role-play, debate, and simulation, they finally agreed to incorporate the Problem Based Learning (PBL) Strategy. The reason for selecting problem-based learning was that it is a student-centered teaching strategy and requires students to improve upon their higher-order thinking skills when they attempt to overcome complex real-life problems (McSweeney & Gardner, 2018). Therefore, taking into account varying viewpoints from all the participants a lesson plan was finally developed using the Problem Based Learning Strategy collaboratively.

The team has decided to use a problem-based learning strategy to develop HOTS. So, the research lesson was designed by considering the steps stated by McSweeney and Gardner (2018):

1. Choose a learning goal for the learners to attain at the end of instruction.
2. Think of a real-world context for the understanding of the content.
3. Identify the teaching contexts where the problems may be introduced. In doing such, be guided by these questions.
    - What open-ended questions can be asked?
    - What learning issues will be identified?
    - How will the learners be evaluated?

Identifying Case Students

Case students are a certain group of students that are selected from a class from varying backgrounds of abilities such as high achievers, low achievers, and average students who will be thoroughly observed during the delivery of the lesson with the aid of the observation sheet (Marsigit, 2007). In this study based on the midterm examination marks, we identified six students from each class (2 numbers of high achievers, 2 numbers low achievers, and 2 numbers of average students). The purpose of case student is to make the student learning visible inside the classroom which otherwise

will be overlooked most of the time. By observing them, we will not only be able to indicate their progression but also find out a few of the barriers to learning for the different achievers and then modify the lesson to address those issues (Setayawan & Taram 2017). Additionally, the case students in this study were grouped into three teams, the case students from class VII A were named Team 1, the ones from 7 B became Team 2, and the ones from 10 B were named Team 3.

Classroom Observation

Next, one of the teacher participants is asked to teach that lesson in a class and the rest of the participants are asked to observe the student learning happening in the class with the aid of an observation sheet. The purpose of the observation is to find out the issues related to student learning so that we can try to address them in the next lesson. During the observation, the focus is more on the students (case students) than the teachers. Moreover, with the aid of the observation sheet, the teacher kept a record of the learning happening for the case students.

Post Conference

Later, a post-research lesson discussion was held to analyze how the students answered to the approach, what improvements they made, and what evidence of learning or of difficulties with learning they displayed. And the team modified the research lesson for the next teaching incorporating changes as per observation and discussion made.

The Lesson Study Cycle

The teacher participants completed three cycles of Lesson Study intervention in three months. During the 1st month, following the procedures above a lesson plan was developed collaboratively and one of the participants was made to deliver in class VII A while the rest of the participants observed the case students (Team 1). After that, a post-conference was held and incorporating the feedback from the observers the lesson plan was revised. During the second month, a participant was made to deliver it in class VII B while the rest of the participants observed the Team 2 case students. Again, a post-conference was held and a revised lesson plan was developed and it was taught in class 10 B in the next month while the rest of the participants observed the Team 3 case students.

Action Research Design

The study was conducted using a mixed-method approach to data collection. Initially, the midterm examination marks were used to find out the worst performing classes with the help of which the case students were also identified. After that, the researchers used an observation sheet to collect the data on case student learning while implementing the LS intervention as described above. After that, a test was conducted to find out the impact of the intervention on the students with regard to HOTS.

Furthermore, a questionnaire survey was also conducted with the teacher participants to find out the benefits and challenges of Lesson Study in the Bhutanese context.

Action Research Participants

After conducting an item analysis, we discovered that 2 sections of the grade 7th with 32 numbers of students each grade and a section of the 10th grade with 34 numbers of students have the lowest difficulty rating concerning HOTS questions in the school. Therefore, we decided to conduct our studies in the above-mentioned classes. Nevertheless, as a part of the lesson study intervention, we identified 6 students each from those classes (2 high achievers, 2 average students, and 2 low achievers) as our case students. With regard to teacher participants, although there were 7 teachers in the Humanity Department who agreed to participate in the research however only 4 could complete the research cycle.

Data collection and tools

The data collection for the student participants happened in three phases. During phase 1, the midterm examination marks were used to identify the lowest performance classes, and with the aid of item analysis (difficulty) we identified three classes as mentioned above that scored the minimum marks for HOTS. Moreover, based on their midterm examination marks six students from each of the classes were identified as case students for the study as discussed earlier. In the second phase, while implementing the lesson study, observation sheets were used to collect the data from the case students. During the third phase, a test (autumn test) was conducted to find out the effectiveness of the lesson study intervention in improving their HOTS, although the test was conducted with all the students only the marks of the case students were taken into account during the study as a part of the Lesson Study intervention process. The data collection for the teacher participants was done through an online survey questionnaire where they were also given the freedom of sharing their views as well.

Results

The impact of Lesson Study on the teacher participants

Figure 2 revealed that lesson study allowed teachers to reflect and make changes in their instructional practices. Teacher participants agreed that it provided a means to collaborate and improve teaching and learning through the development of collective professional knowledge based on teaching experiences. Further, it was considered a means for teachers to experiment, observe and improve their practices. Moreover, lesson study is also agreed to have created a forum where the teachers share ideas and various perspectives and develop learning activities related to the content.

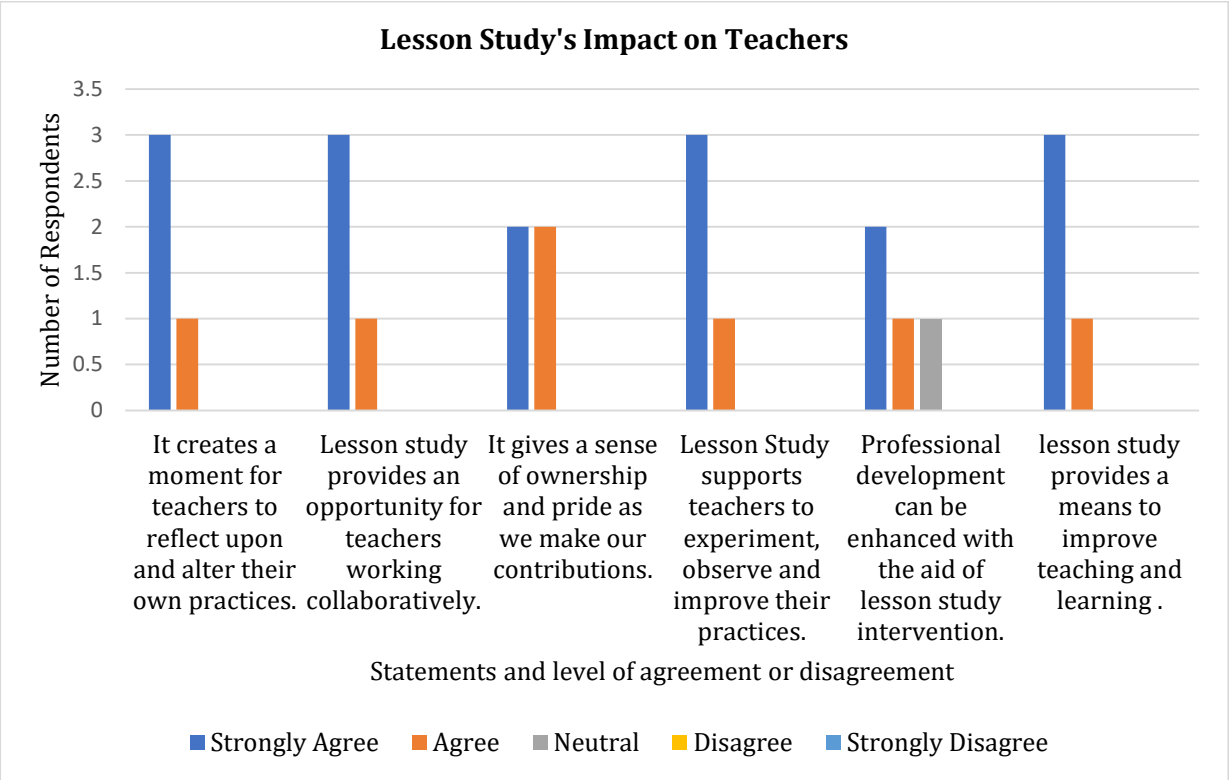

Figure 2: A graph showing the analysis of the teacher participants' responses to the survey questionnaire**.**

Lesson Study's impact on the case students

The team had completed three cycles of Lesson Study. In each cycle, classroom observations were made focusing on case students. The observation was on the student's response to intervention strategies used in the process of teaching and learning. Figure 3 revealed that in the first round of observation three case students could answer the two highest HOTS questions asked. But, in the second round, the number of students answering analyzing questions increased but it remained the same for judging questions and it declined for the creating questions drastically. However, the scores of the case students in the third round increased significantly during the third round.

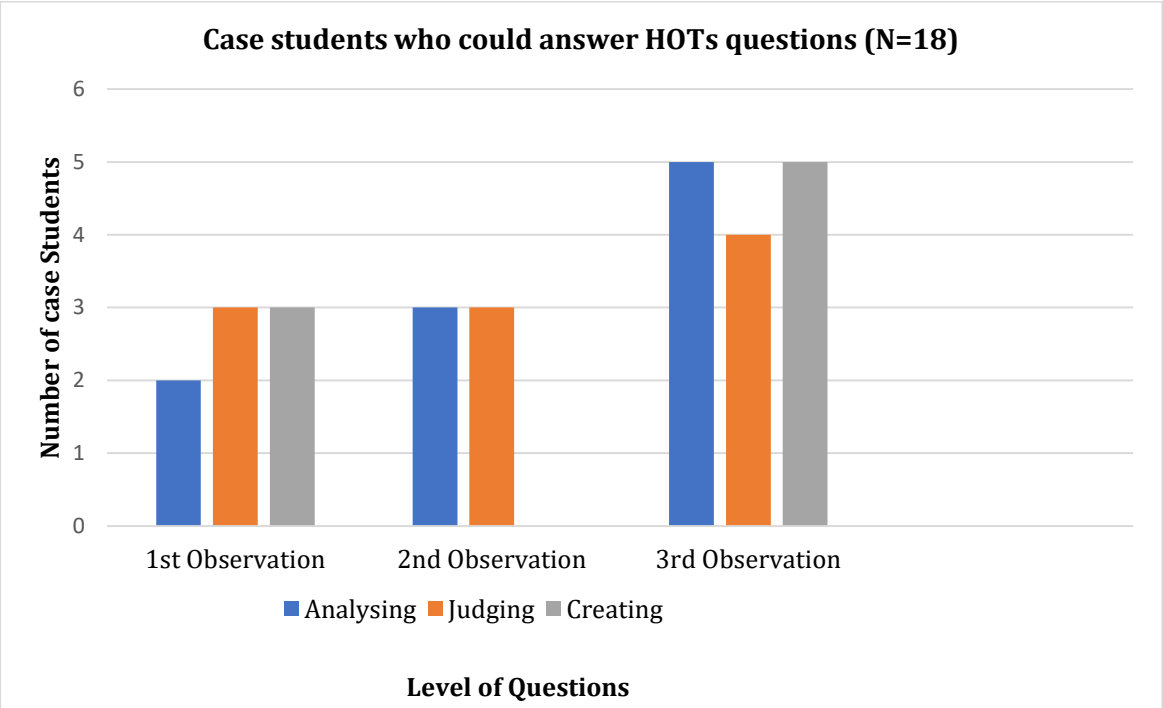

Figure 3: Showing the progress of the case students in answering HOT questions based on the observation sheet.

Comparison of the baseline and post-intervention results of the case students

Figure 4A displays the baseline data collected from the midterm exam (HOT questions) while figure 4B projects the post-intervention results obtained from the autumn test which was conducted using HOT questions. In the figures above case, students from different classes were divided into three teams namely 1, 2, and 3. Team 1 consists of the case students from class 7A, Team 2 includes the case students from class 7B, and Team 3 consists of the case students from class 10 B. In the baseline data for analysis questions, Team 1 and 2 had average marks of zero while team 3 scored average marks of 2.5. Nevertheless, in the post-intervention results, Team 1 obtained average marks of 1.5, team 2 scored average marks of 0.5, and Team 3 scored average marks of 4 indicating a slight improvement. Besides, for evaluating questions, team 1 had a mean mark of 1; team 2 had a mean mark of 0.5 while team 3 had a mean mark of 1.5. However, in the post-intervention results for the analysis questions, team 1 scored a mean mark of 2.5; team 2 obtained a mean mark of 1.5, and team 3 scored a mean mark of 4 indicating that all three teams have significantly improved their scores in this aspect. Additionally, in the baseline results for the creating questions, team 1 scored an average mark of 1.5, team 2 scored an average mark of 1.5, and team 3 obtained an average mark of 3.5. However, the post-intervention results for the creating questions indicated that although the mean scores of teams 1 and 2 had improved slightly, the mean score of team 3's mean mark reduced by 0.5 marks. On the whole, it is concluded that the lesson study intervention was successful in improving the students' HOTS.

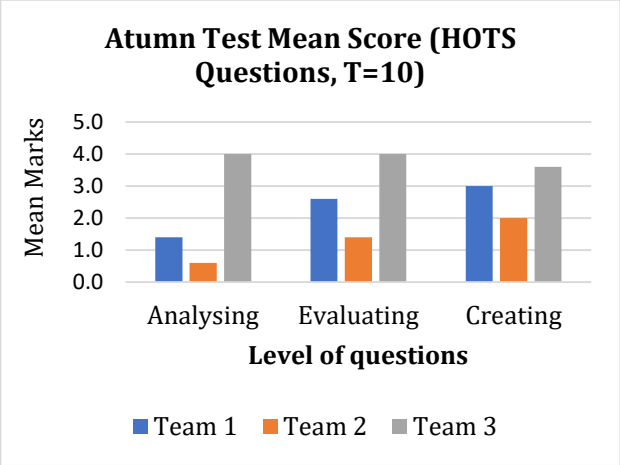

Figure 4A: Baseline data

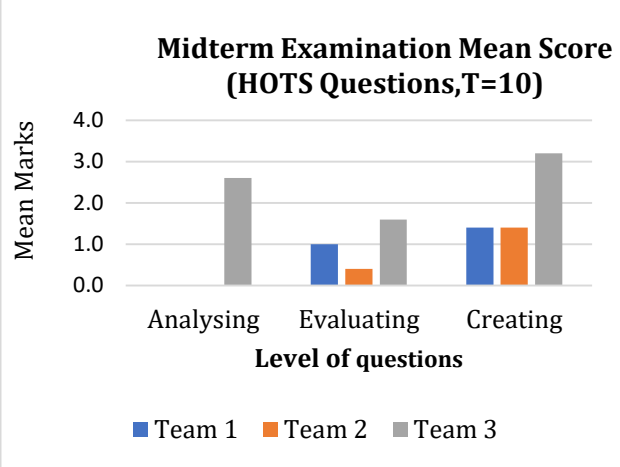

Figure 4B: Post Intervention Results

Challenges faced in carrying out Lesson Study

Figure 5 displays the data gathered from the teacher participants which were collected using a survey questionnaire. The results suggest, that all four participants have agreed that the workload of the teachers is a challenge for them while implementing the Lesson Study. Likewise, one of the respondents has written, “I have 23 periods in a week, and finding the time for discussion and collaboration is difficult as I also need time for myself and my family." Furthermore, out of the 4 participants, 3 agreed that the lack of support from the management is another challenge. Additionally, one of the respondents has stated, "though I have a high number of teaching periods a week I feel the management can find ways to help implement LS." And all the participants agreed that Lesson Study is time-consuming. The data revealed that time constraint is a common challenge that limits teachers' effective participation in lesson study. Participants' reflection on the inaccessibility of time was attributed to contextual factors such as different teaching periods, workload, and other professional responsibilities

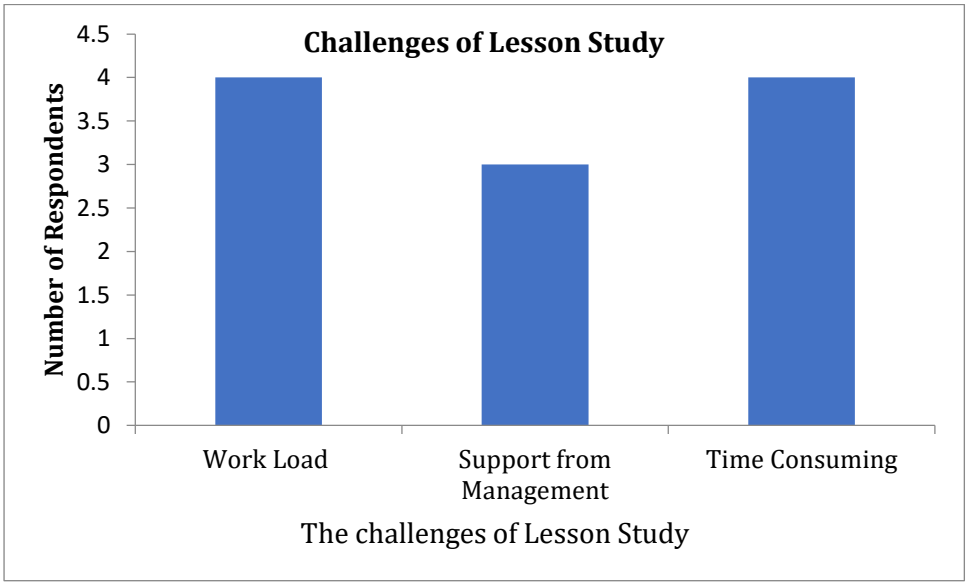

Figure 5: Showing the challenges related to Lesson Study Intervention

Discussion

This study indicates that lesson study provides an opportunity for teachers to work collaboratively on practical issues related to teaching and learning. It has also created a forum where teachers get opportunities to question, explore and reflect on every phase of the teaching and learning process. Thus, it facilitated valuable discussions on pedagogy and subject, giving teachers new perspectives on their practice. The results of this study are in agreement with the findings of Vermunt et al., (2019), Schipper et al., (2017), Schipper et al., (2018), and McSweeney & Gardner; (2018). Similarly, the study has also depicted that the case students' HOTS were improved with the aid of lesson study intervention. Moreover, the case students' post-intervention mean marks for HOTS thinking questions increased significantly as compared to the baseline average marks, which is in alignment with studies carried out by Gunawan (2017). Eventually, it delineated that it has increased students' scores as outlined in the studies carried out by Somma (2016) and Gunawan (2017). So, LS is found to be an effective tool to improve classroom practices and therefore student learning and to promote PLC in the school.

However, time constraints and professional work pressure faced by teachers affected the effective application of LS. For this study, the teacher participants have been reduced to four by the third cycle. In addition, teacher participants felt that the peer observation and the extra workload arising from the lesson study planning and post-lesson reflection put extra pressure. These findings are in agreement with Marsigit (2007) and Schipper et al. (2017). Therefore, reducing the workload of the teachers and creating a space for teachers to meet and discuss teaching and learning, a thorough orientation on lesson study and its process are found to be vital to promote LS. Similarly, in the current school working system, there is hardly any professional interaction and any occasion to converse with colleagues about teaching and learning.

Consequently, it has affected the effectiveness of LS as it requires the team to collaborate to plan, teach, observe and revise the lesson. In addition, participants found it difficult to shift the focus from 'isolation' to 'collaboration' and 'observing teaching' to 'observing learning.' So, encouraging collaboration and engaging teachers in the process of LS timely can promote the current system.

Conclusion

The findings of this study showed that the application of the lesson study had contributed to the growth of the school PLC and improved students' learning. It has provided a space for teacher participants to collaborate, discuss ideas, observe and develop lessons. Ultimately, the LS intervention process has helped students to learn better. It is through LS structured process that the team got to learn more and improve classroom practices. So, it brought a positive impact on the professional development of teachers and students' learning.

However, the success of LS would depend on one's school culture. Teachers who apply LS should be reinforced by school management and they should be motivated to use it. Else, this approach, which needs a lot of time and effort, is doubtful to be effective. Accordingly, by introducing the LS in the system, creating space for professional interaction would help to promote the efficiency of LS. Thus, creating a community of collaboration and engaging teachers in the process of LS seemed significant for the success of LS.

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