



European Journal of Educational Research

Volume 10, Issue 4, 1755 - 1768.

ISSN: 2165-8714

<http://www.eu-jer.com/>

Applying the Lesson Study Model in Developing Teaching Capability for Young Teachers in Vietnam

Le Thi Thu Huong 
Thai Nguyen University of
Education, VIETNAM

Nguyen Thi Thuy Quynh 
Vietnam University of
Education, VIETNAM

Nguyen Thi Ngoc 
Thai Nguyen University of
Education, VIETNAM

Nguyen Mau Duc 
Hanoi National University of
Education, VIETNAM

Received: January 9, 2021 • Revised: May 29, 2021 • Accepted: August 10, 2021

Abstract: The initial period of young teachers' careers is always significant in developing their professional capability. This is when teachers start coming into contact with practical teaching, which is more diversified than the theoretical training at the University. In this research, the authors propose a process of combining the Lesson Study model with the micro-lesson teaching method. This process helps young teachers, especially those working in the Northern of Vietnam, improve their planning and implementation of a lesson plan following the Lesson Study model. It has four steps: (1). Plan a Lesson Study; (2). Organize demo teaching and attend lessons; (3): Self-evaluate and discuss lessons; (4): Apply for practical teaching. The methodology research is carried out on 62 young teachers in Vietnam to measure the pre-impact and post-impact results. The results reveal that the researched group has made significant progress on their teaching performances (the average points for their capability of planning lessons have increased from 2.54 to 3.28 and the average points for their capability of implementing lesson plans have increased from 2.48 to 3.18). This development can be considered as an excellent experience to bring the Lesson Study model into Vietnamese schools to improve teaching sustainably.

Keywords: *Chemistry teaching, lesson planning, teaching capability, young teachers.*

To cite this article: Huong, L. T. T., Thi Thuy Quynh, N., Thi Ngoc, N., & Mau Duc, N. (2021). Applying the lesson study model in developing teaching capability for young teachers in Vietnam. *European Journal of Educational Research*, 10(4), 1755-1768. <https://doi.org/10.12973/eu-jer.10.4.1755>

Introduction

Professional activity is a familiar term to every teacher because it is a regular activity of the school. This is one of the fostering teaching methods to improve the professional ability of teachers, resulting in the development of educational quality for students in general (Lee, 2008). However, professional development activities reveal issues that need to be changed. Firstly, the quality of professional activity is not good. In project time and principally, in the exchange of experience this is conducted in a formalistic manner, and thus teachers are not engaging in the discussions. The guidance on content preparation for professional development activities is superficial and not convincing, so it does not attract the focus of teachers. The subject content taught to students is limited, and does not go sufficiently deep into tackling the major problem of profession and pedagogy, which can help to remove the difficulty for teachers; plus, new and arduous issues are not discussed. Because the purpose of an external person attending a lesson is to evaluate teachers' ability, it puts pressure on both teachers and attendees (Duc, 2016). Teachers listen in silence, and the presenters become the judges (Ylonen & Norwich, 2012). To integrate professional development and teaching capability for teachers effectively and firmly, the authors see the professional development activities according to a devised Lesson Study model (Schipper et al., 2020; Yildiz, 2017).

As improvements are required in Vietnamese education's fundamental and comprehensive innovation in the context of globalization and technology revolution, the education sector must change in every aspect. Particularly, improving the quality of the teaching is the most significant determinant (Do et al., 2020). "Lesson Study" is a method to enhance the technical ability of teachers, develop the teaching and learning quality in the classroom to enhance student's outcomes through researching teaching activities in a specific lesson (Fernandez & Yoshida, 2004). Until now, Lesson Study is recognized as a model and puts teachers at the center of professional development activities with the desire to understand the study needs of their students.

*** Corresponding author:**

Nguyen Mau Duc, Faculty of Chemistry, Hanoi National University of Education, Vietnam. ✉ nmduc@hnue.edu.vn



The Lesson Study model has also been introduced in many countries around the world and has attracted the attention of educators and scholars, including the United States (Fernandez & Yoshida, 2004; Lewis, 2019; Stigler & Hiebert, 2000), Japan (Murooka, 2007; Saito et al., 2006; Saito & Tsukui, 2008a), the United Kingdom (Ruthven, 2005; Ylonen & Norwich, 2012) Australia (Widjaja et al., 2017), Hong Kong (Lee, 2008), Taiwan (Jhang, 2020), Germany or Turkey (Xu & Pedder, 2014). The American Federation of Teachers has affirmed that Lesson Study is an effective form of professional training for teachers (C. Lewis et al., 2004).

In the South East of Asia, the Lesson Study model has been introduced in several countries and territories such as Brunei (Abdullah & Leung, 2019), Indonesia (Saito et al., 2006), Malaysia (Lim et al., 2016) Thailand (Inprasitha, 2011), Singapore (Goh & Fang, 2017) and Vietnam (Kieu, 2018; Saito et al., 2012; Saito & Tsukui, 2008b). The above studies mainly focus on applying the model of Lesson Study to teaching at primary and secondary schools. For example, in Vietnam, from 2014 the Ministry of Education and Training has been ordering the implementation of the Lesson Study model from grade schools to secondary schools (Ministry of Education & Training, 2014a). In this model, the meetings for professional development are required to be organized at least twice per quarter. 100% of teachers have followed exactly the requirement. According to the survey involving 398 teachers about applying the Lesson Study model in Vietnam, about 98% of the respondents agreed that taking part in professional development activities have enhanced their teaching abilities, also 92% of these interviewees believed the Lesson Study model is the most effective model to develop teachers' capabilities (Duc, 2016). Lesson Study is always received warmly, even though the culture and education programs of each country are different (Ministry of Education & Training, 2014b).

Most of the activities introducing the Lesson Study model in the countries mentioned above are aimed at groups of teachers in all subjects in the school, but especially Mathematics, (Lim et al., 2016; Yoshida & Jackson, 2011; Vui, 2015). However, in some cases, such as in Indonesia and Vietnam, the whole school is involved in the very first step of the Lesson Study model/method (Saito & Tsukui, 2008a; Tsukui & Saito, 2018). Many educators and researchers who are interested in the Lesson Study model realize that it helps to change the teaching and learning practices of teachers, as well as enhance the school culture (Coenders & Verhoef, 2019; Schipper et al., 2020; Widjaja et al., 2017; Ylonen & Norwich, 2012).

In Vietnam, the Lesson Study model is the first project planned and conducted to promote the act of placing students as the center of the education (student-centered content) at school. The Ministry of Education and Training of Vietnam and the Japanese International Cooperation Agency (JICA) have conducted this project since October 2004, with five pilot schools. One of the famous places applying professional development activities through the Lesson Study model from 2006 to 2007 is Bac Giang with five primary schools in the Luc Nam and Yen Dung district, namely, Lao Ho primary school, Bich Son primary school, Doi Ngo primary school, Nghia Phuong 1 primary school, Tan My primary school (Tran et al., 2016). The positive results from these pilot schools are used as the basis for the Ministry of Education and Training to implement the Lesson Study model at also in middle school, high school, and continuing education center.

"Lesson study" is developed from the doctrine of some educational scientists. Firstly, Vygotsky's Theory of Zone of Proximal Development: "Zone of Proximal Development" according to Vygotsky is defined as "the difference between what a learner can do without help and what he or she can achieve with guidance and encouragement from a skilled partner" (Luckin & Du Boulay, 2016).

Secondly, Mikhail Bakhtin's theory of dialogic circle: People learn through interactions between dialogic circles. According to the theory of Mikhail Bakhtin, human learning has profound social significance. The process of teaching in general and learning, in particular, is not only the vertical interaction between teachers and students but also horizontal interactions, between students and students, and between students and learning materials. Interaction through the circles of dialogue is not only a physical tool but also a powerful psychological tool to motivate learning (Radunović, 2014).

Thirdly, behavioral theory: Learning is behavioral change. The theory indicates that learning is a simple process in which complex relations will be divided into logically arranged learning steps that make it easy to understand knowledge and skills. Through content stimulation, teaching methods, learners have reactions that create learning behavior and change their behavior. The behavioral theory does not take into account internal factors but limits the study of learning mechanisms to observable external behaviors. The important principle is to divide the learning content into small knowledge units, organize for students to acquire knowledge and skills in a sequence, regularly check outcome results to make possible changes to the learning process (Bolling et al., 2006).

Therefore, the specific research questions were to:

- 1) How to develop teaching capacity for young teachers through the combination of lesson study model and micro-teaching method?
- 2) What are the results achieved in developing teaching competence for young teachers through the lesson study model?

Methodology

Research Goal

By studying the practice of teaching chemistry by young teachers, the researchers have developed an extensive system of vital chemistry teaching capabilities necessary for teachers at high school, according to the professional development course by the Ministry of Education and Training in 2014.

The Lesson Study plan comprises two broad groups, which are:

- The capability for planning lessons and
- The capability for implementing lesson plans according to the Lesson Study model (Ministry of Education & Training, 2014b)

Sample and Data Collection

The author implemented the pedagogical experiment through the teaching of chemistry in the school year of 2018-2020 in 56 different secondary schools in northern mountainous areas. 62 young teachers teaching Chemistry, who are under 30 or have less than 8 years of teaching experience, were selected as the only research target. The number of participants in this research is from five different Northern provinces of Vietnam, which are Thai Nguyen (15 teachers), Cao Bang (15 teachers), Tuyen Quang (15 teachers), Lang Son (10 teachers), Bac Kan (7 teachers). They participate in designing and organizing Chemistry lessons and later, the author evaluates the progress of young teachers and the impact of the Lesson Study model on their teaching performance.

The process used in the research included 4 stages: (1): Design of the Study; (2): Organize Demo teaching and attend lessons; (3): Reflect and discuss lessons; (4): Apply to practical teaching. Conducting the pedagogical experiment is expected to show the feasibility and soundness of the proposed measures.

Stage 1: Design of the Study

a. Select a Lesson

Teachers choose a content, topic or lesson that interests the young teachers and students the most. This content, topic or lesson is what teachers have difficulty in teaching and students find hard to understand. The contents that are of interest of young teachers and students are one element to consider in developing curriculum.

b. Plan a Lesson

- Prepare lesson plans

When designing lesson plans, teachers together predict students' thinking, how they perceive lessons, and their reactions to what teachers teach. At the same time, teachers also put themselves in the position of students and imagine as a first-time learner to see the difficulties in solving problems raised in the lesson from which to find suitable methods. On that basis, the authors study and identify 10 criteria for the capability for implementing lesson plans (Duc & Chien, 2014; Ministry of Education & Training, 2018) (presented in Table 1).

Table 1. Table of criteria evaluating the capability for making lesson plans through teaching a lesson

No.	Criteria evaluating the capability for making lesson plans	Evaluate the level of capability for making lesson plans/ Point				Comment
		Level 1 (1 point)	Level 2 (2 points)	Level 3 (3 points)	Level 4 (4 points)	
1	State lesson goals (knowledge, skills, and attitude).					
2	Identify core knowledge and the focus of the lesson.					
3	Build lesson structure (Ministry of Education and Training).					
4	Estimate time for each activity.					
5	Propose teaching approaches methods, facilities, and forms.					
6	Table describing the activities of teachers and students during class.					
7	Develop a question system (The teachers).					
8	Predict possible problems arising during class.					
9	Build a feedback tool (Questionnaires after the lessons)					
10	Form of lesson plans					
Total points/40						

- Devising and Implementing lesson plans

Applying the Lesson Study model in teaching chemistry at secondary schools is to be implemented by young teachers. This is to help them nurture their pedagogical skills as well as to advance their knowledge. The teachers have a meet-up to discuss about which knowledge section needs to be focused on, usually, a difficult one will be chosen. The chosen section is divided into many activities called micro-lessons. When conducting a micro-lesson, the young teacher chooses a specific unit in the textbook which related to the chosen section and follows the process as in Figure 1.

The process is carried out as follow:

Step 1: The young teacher starts planning out a demonstration lesson in 5-15 minutes;

Step 2: Start practical teaching with the prepared plan in 5-15 minutes. During this step, the young teacher is supervised by senior teachers or qualified experts who are experienced in the field of teaching. Also, the teaching session is recorded;

Step 3: The young teachers watch the record from Step 2, then discuss and responds to any proposed questions. Meanwhile, other young teachers who are attendees during this practical teaching can gather opinions and use them as references for their future demonstration lessons. These opinions benefit them as they can see each other's strengths and weaknesses when applying the Lesson Study model in their teaching. Furthermore, this re-observation can help other teachers give precise comments on the performance. The discussion time should be under 5-7 minutes;

Step 4: Modify the lesson plan. The observed teacher re-plans his/her lesson based on the opinions received from the previous steps. To save time, this step can be done at home;

Step 5: The teacher undertakes another round of teaching. This step can be carried out without the supervision of senior teachers or experts. Also, it is not necessary to use professional record devices, although the teacher may find it helpful to use their mobile phones to record for future reference in self-evaluation sessions;

Step 6: The young teacher receives an evaluation of their skills to raise his/her existing skills, and then re-modifies the lesson plan.

Where necessary, it is possible to repeat as much as needed from step 2 to step 5 until the lesson plan is completed and the teaching skills are improved. This process is shown through the following figure:

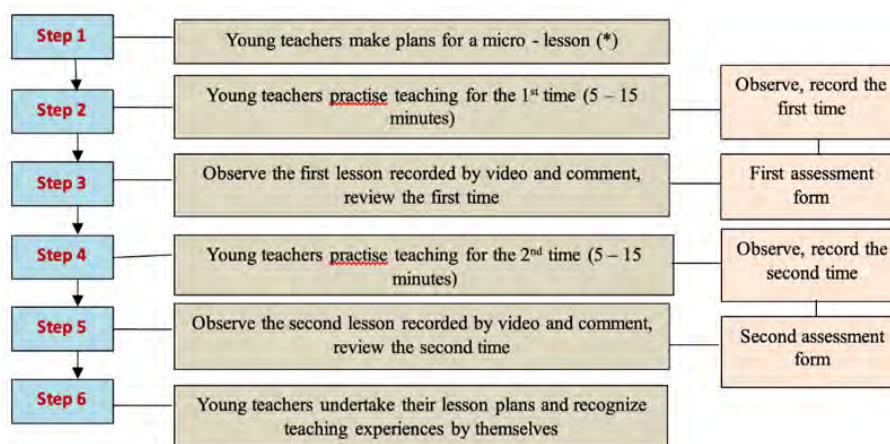


Figure 1. The process of using the micro-teaching method to raise the teaching capability for young teachers

Stage 2: Organize demonstration teaching and attend lessons

Demonstration teaching is an essential step in the professional development activities within the Lesson Study model. This is also the stage of implementing the Lesson Study model. In demonstration teaching: Teachers need to conduct demonstration teaching with their students. The requirement is that teachers cannot teach before the demonstration teaching. In attending lessons, teachers and young teachers attend together. They should observe facial expressions, attitude, behavior, interactive relationship between teachers, and students and between students and students during the teaching process of the demo lesson. Attendees can take photos or record videos of teaching and learning activities. They also take notes/ record questions of teachers and answers of students and observe the attitude of students. By doing that, they could think, analyze the reasons and propose positive solutions.

To design the tool to evaluate the capability for implementing lesson plans of young teachers, the author needs to base on the textbook instruction published by the Ministry of Education and Training for Vietnam secondary schools and develop a table with specific criteria (Ministry of Education & Training, 2018). The attendees, who are Chemistry

teachers and experts, will use the table to evaluate the performance of the observed teacher in the lesson. These criteria in the table directly related to the capability of organizing a lesson with the Lesson Study model, as below in Table 2:

Table 2: Table indicating criteria for evaluating the capability for implementing lesson plans through applying the model

No.	Criteria expressing the capability for implementing lesson plans	Evaluation of the level of lesson planning capability development/Point				Comment
		Level 1 (1 point)	Level 2 (2 points)	Level 3 (3 points)	Level 4 (4 points)	
1	Ensure accuracy, logic, and clarify the focus of the lesson/ study					
2	Use language					
3	Use questioning/ exercises					
4	Use teaching methods, techniques					
5	Use media in teaching					
6	Use chemistry experiments					
7	Integrate content? in teaching activities					
8	Flexible handling pedagogical situations during school hours? build a friendly learning environment.					
9	Able to Distribute time for the lesson and each activity					
10	Assessment of students' Performance during and after the lesson.					
Total points/40						

Stage 3: Reflect and discuss lessons

Contemplating and sharing after the lesson is the most essential activity of professional development activities according to the Lesson Study model. After the demo teaching, teachers majored in chemistry, experts in the education sector and the young teachers will discuss the lesson together. This activity is the most important one in the Lesson Study model as it affects immensely the quality and effectiveness of professional development activities. To achieve the purpose of the discussion, the participants must take part in activities and share ideas with a constructive spirit (Figure 2).

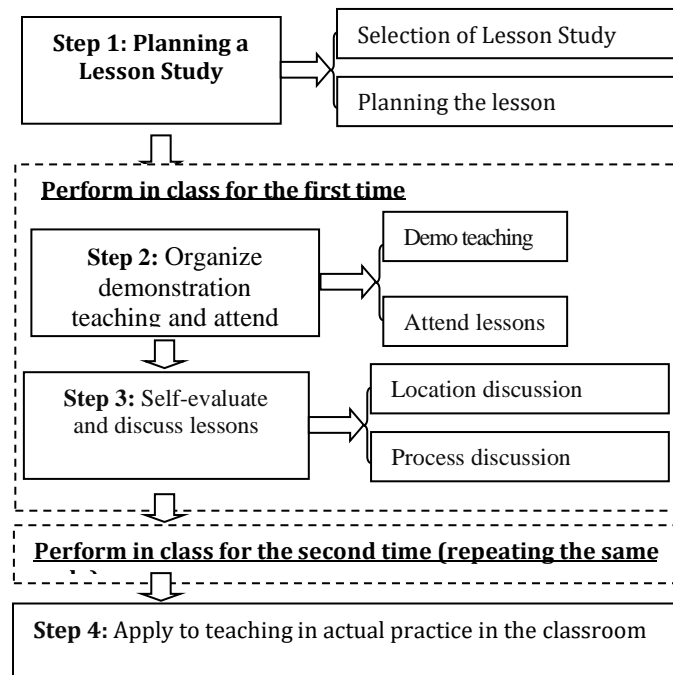


Figure 2: Steps in the Lesson Study model for teaching purposes

Step 1: The host states the purpose of the discussion.

Step 2: The young teacher who gives a demonstration lesson to representatives of the research team, states the goals of the lesson, the ideas of changing the content, methods, and teaching tools to fit specific students and their feelings after teaching lessons, concerns or difficulties in implementing the lesson.

Step 3: Attendees share their viewpoints about the lesson.

After the young teacher presents, the attendees can ask questions to understand the intent of the teacher better. The research team representatives are also responsible for answering the questions of the attendees and adding their viewpoints to explain the intent of the whole team further.

The whole team discusses these contents components of the lesson such as:

a) The lesson: After teaching, does the lesson help students achieve to attain the learning objectives? What is the effect of the lesson on students? Are the teaching methods and media used suitably? How do these activities affect capability, soft skills education for students (e.g. presentation skill, leadership skill, teamwork control, communication skill, problem-solving skill)?

b) The cognitive process of students: Through the reactions, attitudes, and the ways employed to solve the problem of students, the attenders give advice, the proof rationale for comments made on things they have seen about learning, thinking, and solving the problem of students.

Each member in the group is expected to have candidly consider the pros and cons and to share, comment on ways to improve the lesson. The focus of the discussion is the lesson and the students. The discussion is not to be used to evaluate, criticize the quality or the capability of the young teachers.

When holding a meeting after attending the lesson (professional activity), important aspects on which to focus are:

- Using photos or videos recorded during the demonstration lesson. This is to ensure the remarks or evaluations are unbiased. The photos or videos can be rewind/paused and used as a reference.

- Keeping the opinions of teachers and other attendees relevant to the main topic during the evaluating session; avoiding imposing any personal preferences or giving unnecessary criticism. [It is preferable to give a remark with a subtle, gentle, and witty manner (thus refraining from any form of aggressive comments, especially to the person who does not share the same point of view. Otherwise, the meeting can become intense and despondent, thus, stopping others from sharing their opinions)].

- Developing and creating a habit of listening and sharing opinions in a positive and constructive manner while putting oneself into the position of the teacher who is being evaluated. It is not recommended to make the subject come under heavy criticisms, which can lead to negative responses and even personal hatred.

- The host of the meeting needs to encourage the attendees to share their opinions while distributing the time evenly to avoid situations of sharing too much, too little, or too generally.

Stage 4: Apply to actual teaching

After discussing the first lesson, all teachers think about whether or not they need to continue undertaking other lessons based on the Lesson Study method. If the Lesson Study is still incomplete for the first time of teaching, the young teacher needs to repeat the process in the second time of teaching, and changes can be made. If no changes are made, the teacher reflects on how young teachers change the experience for other members to learn from the experience in their next class? Teachers need to consider all of these questions to be ready to improve their lesson in their next class. From the comments received after the discussion, the research team continues to revise the lesson to suit other classes' audience.

Thus, if the process of studying a lesson done once in a class is considered as a "unit", the process of conducting the Lesson Study model includes many "units". The units follow each other and create a cycle of lesson study model; lesson records are absorbed and developed. This cycle ensures that the process of the Lesson Study model is revised, implemented, and evaluated continuously.

Analyzing of Data

This article uses SPSS for Windows tool to process research data with the help of calculations as Standard deviation, independent t-test verification (p), Effect Size (ES). After requiring the target group to use the Lesson Study model in their teaching performance, the author need to make an evaluation and comparison between the results of pre-impact (only use traditional teaching method) and post-impact (apply Lesson Study model in teaching). The impact evaluation is based on the criteria of Table 1. Evaluating the capability for designing lesson plans through teaching lesson and Table 2. Evaluating the capability for implementing lesson plans through teaching Chemistry lessons in secondary schools in Vietnam. The findings showed that the capability for making plans and implementing lesson plans in teaching Chemistry at high schools of the pre-impact and post-impact groups was reached ($p > .05$). The ES (Effect Size)

values shows that the use of the Lesson Study has a massive impact on developing the capability for making and implementing lesson plans for young teachers in teaching Chemistry at high schools. IBM SPSS 23 Software Program was used to analyze the data. All analyses were tested at .05 significance level.

Findings

Experimental Process

The use of the Lesson Study model is to evaluate or provide teachers feedback on teaching practice. Teachers implementing Lesson Study gain from the results and comments on the use of their teaching methods and the thinking of students. There are many ways to split the stages of a Lesson Study model, but in this study, the authors have divided the process into four Lesson Study steps, following the prior study of C. Lewis & Perry, (2017). These four steps are also more applicable within the learning environment in Vietnam:

To test the effectiveness of the research approach, using the table of criteria in Table 1 and Table determining the capability for applying the Lesson Study model to develop make and implement lesson plans for young Chemistry teachers at high schools in 5 northern mountainous provinces. The results obtained are as follows:

* Survey on the opinions of applying micro-teaching measures to improve the capability for making plans in teaching Chemistry at high school:

After conducting pedagogical practice with micro-teaching measures to improve the capability for making plans in teaching Chemistry at high school, the author has investigated and obtained 62 assessment forms from young teachers to evaluate the quality and effects of applying micro-teaching in teaching Chemistry at high school in the school year of 2019- 2020.

Interpretation of results

According to the survey above, it can be seen that most young teachers are interested (accounting for 29.0%) or very interested (accounting for 61.3%) to apply micro-teaching to make students more interested (59.7% are very interested, 30.6% are interested) (Figure 3, figure 4). A young teacher Tran Thi Dien at Dai Tu High School in Thai Nguyen suggests the following: "Dividing the class into small classes helps to create a friendlier learning environment to prepare lectures in large classes. This has encouraged many students to actively participate in response to the lesson, including shy and average students. Dividing the teaching activities has created students' self-discipline, initiative and creativity". Thus 100% of young teachers responding very important to the application of the micro-teaching method to improve the capability for making plans in teaching Chemistry is reasonable.

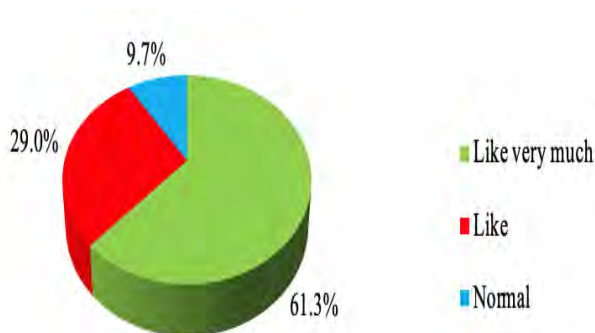


Figure 3: Diagram of young teachers' opinions about applying micro-teaching in teaching Chemistry

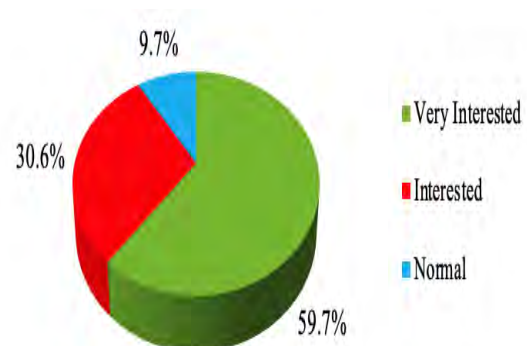


Figure 4: Diagram of young teachers' comments on micro-teaching lesson for students

The above results can be explained when applying the micro-teaching method because only one component activity is the focus; so it is easier for young teachers to plan and remember compared with planning and remembering the whole lesson which consists of different component activities. On the other hand, focusing on training detailed sub-skills has played a part in improving specific teaching capability for each teacher such as skills to ask questions, use proper language, conduct experiments, use teaching methods and teaching facilities. The training time is short, does not cause stress for young teachers to practice or create boredom for attenders.

* Surveying on opinions of applying the Lesson Study model in teaching Chemistry

After the end of the pedagogical experimental period, the author investigated through questionnaires with 62 young teachers on the quality and effect of applying the Lesson Study model in teaching Chemistry.

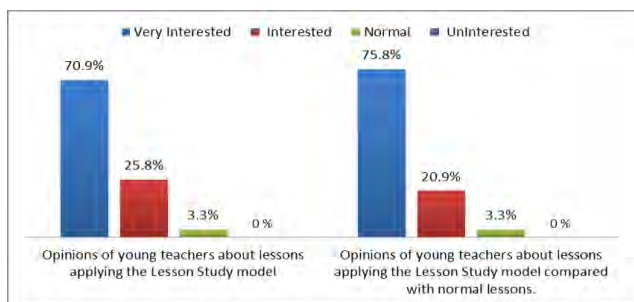


Figure 5: Young teachers' opinions on lessons Applying the Lesson Study model

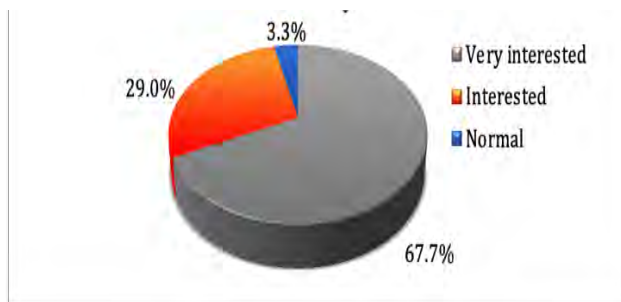


Figure 6: The level of young teachers' interest in lessons applying the Lesson Study model

As can be seen from Figure 5 and Figure 6, most young teachers are very interested in participating in lessons applying the Lesson Study model, and the Lesson Study model helped young teachers be more interested and to teach more actively. Details in Figure 7 below:

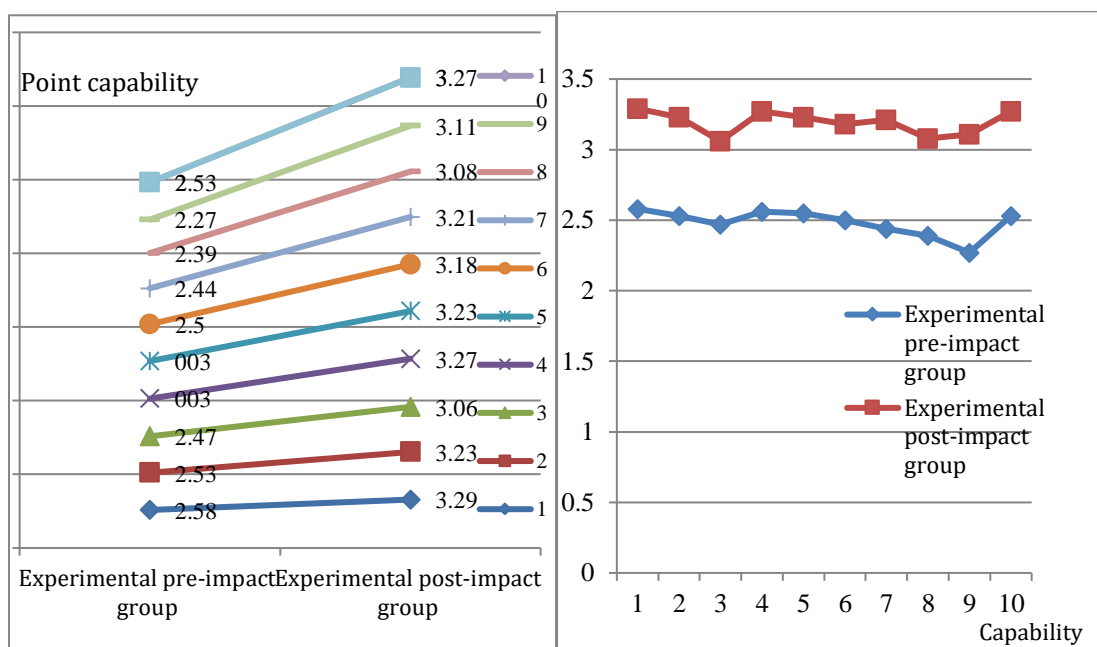


Figure 7: Chart of progress in the capability for implementing plans in teaching Chemistry at High School of the pre-impact and post-impact group

The above - given chart of the progress in improving the capability for making and implementing the lesson study model in teaching Chemistry at high schools in 5 northern mountainous provinces of Vietnam: Thai Nguyen, Lang Son, Tuyen Quang, Cao Bang, Bac Kan (Figure 7). They show that each capability that the author evaluated increases gradually during the training program shown in the figures on the left. The graph shows that each capability goes up and thus the right figures, the average point of the post-impact group, is higher than the pre-impact group.

Interpretation

Table 3: The average score of capability for making plans in teaching Chemistry at high schools of the pre-impact and post-impact groups

Criteria	Post-impact group					Pre-impact group				
	The number of young teachers scores				Average score of each criteria	The number of young teachers scores				Average score of each criteria
	1.0	2.0	3.0	4.0		1.0	2.0	3.0	4.0	
1	2	3	21	36	3.47	12	16	15	19	2.66
2	2	6	25	29	3.31	15	16	15	16	2.52
3	3	6	25	28	3.26	13	17	21	11	2.48
4	2	4	25	31	3.37	14	16	16	16	2.55
5	4	6	24	28	3.23	12	14	17	19	2.69
6	4	6	22	30	3.26	13	18	19	12	2.48
7	6	6	22	28	3.16	15	14	22	11	2.47
8	4	6	23	29	3.24	13	19	15	15	2.52
9	6	7	23	26	3.11	16	15	20	11	2.42
10	2	6	22	32	3.35	12	15	20	15	2.61

Table 4: Describing and comparing the points of capability for making plans in teaching Chemistry at high schools of the pre-impact and post-impact group

Data Analysis	Variables	pre-impact group	post-impact group
Data description	The average score	2.54	3.28
	Average score difference		0.74
	Standard deviation	1.08	0.77
Data comparison	Dependent t-test (p)		0.000
	Effect Size ES		0.68

Table 5: The average score of the capability for implementing lesson plans in teaching Chemistry at High School of the pre-impact and post-impact group

Criteria	Post-impact group					Pre-impact group				
	The number of young teachers score				Average score of each criteria	The number of young teachers score				Average score of each criteria
	1.0	2.0	3.0	4.0		1.0	2.0	3.0	4.0	
1	4	5	22	31	3.29	14	15	16	17	2.58
2	3	7	25	27	3.23	15	15	16	16	2.53
3	6	9	22	25	3.06	14	16	21	11	2.47
4	3	5	26	28	3.27	14	16	15	17	2.56
5	6	6	24	26	3.13	14	17	14	17	2.55
6	5	6	24	27	3.18	13	18	18	13	2.50
7	4	7	23	28	3.21	15	16	20	11	2.44
8	6	9	21	26	3.08	15	20	15	12	2.39
9	6	7	23	26	3.11	18	19	15	10	2.27
10	3	5	26	28	3.27	14	15	19	14	2.53

Table 6: Descriptive statistics and results of dependent t-test for the capability for implementing lesson plans in teaching Chemistry at High School of the pre-impact and post-impact group

Data Analysis	Variables	pre-impact group	post-impact group
Data description	The average score	2.48	3.18
	Average score difference		0.70
	Standard deviation	1.09	0.86
Data comparison	Dependent t-test (p)		0.000
	Effect Size ES		0.64

Results from table 3, 4, 5 and 6 show that:

The average value shows that when following the Lesson Study model in teaching chemistry at high schools, young teachers of the post-impact group have a higher score than young teachers of the pre-impact group, (the average score difference between the pre-impact group and the post-impact group is 0.74, and that of capability for implementing Lesson Study is 0.70). This explains that applying the Lesson Study model has a significant influence on the formation and development of capability for making and implementing lesson plans for young teachers in teaching chemistry at High School.

Table 6 shows Effect Size (ES): ES = 0,68 (the capability for making lesson plans) and ES = 0,64 (the capability for implementing lesson plans).

From the ES values, table Cohen (Ministry of Education & Training - Vietnam Belgium Project, 2010) shows that the use of the Lesson Study method has a massive impact on developing the capability for making and implementing lesson plans for young teachers in teaching Chemistry at high schools. The p-value between the pre-impact group and the post-impact group is always below 0.05. This demonstrates a clear difference in average points of students preparing and implementing lesson plans for young teachers of the pre-impact group and the post-impact group in teaching Chemistry at high schools is not likely to happen randomly. It proves that the impact of the Lesson Study method has made a tremendous impact on experimental groups.

Discussion

There were many studies in the world about the teaching capacity of young teachers. These studies discuss some affected factors to the teaching competence of young teachers. Some of the main influencing factors are as follows:

Professional knowledge: Young teachers are often good at professional knowledge but are not good at professional skills because they are novice teachers. Young teachers often face problems related to planning and implementing instructional activities. They are often dissatisfied with their own teaching activities at K12 - schools. It is shown that when young teachers prepare for lessons, they always identify what kind of activities, what resources they will benefit from schools, and how they will use them, what kind of material to use in the lesson (Yetkiner & Bıkmaz, 2019). Young teachers can also refer to the experiences of experienced teachers in their school and apply new ideas to their lesson plans. So that they will gradually realize their weaknesses in methods, skills, through which their professional competence is enhanced and they will discover many new things in their work.

The role of the principal: How can each teacher learn something useful through each professional activity? How can professional activities become an indispensable "spiritual food" for every teacher? How can professional activities bring practical effects to improve professional capacity and bring learning efficiency for students, improve education quality? This depends a lot on the leadership roles of the principal and educational administrators. Effective leadership will be an important determinant of the sustainability of professional activities. They will choose to use the purpose of lesson study, the innovation model of professional activities as the principles of implementing educational innovation (Seleznyov, 2020; Williams et al., 2014). Right from the beginning of the school year, the principal needs to form a management team to develop a plan of professional activities at the school for the whole school year. Organize 3 to 4 sessions per month. The duration of each session is about 3 to 4 hours, of which the first 35 to 40 minutes are devoted to observing the teaching and learning activities, the rest of the time is for sharing and reflecting on the lesson just observed. Based on the number of teachers at the school, the management team will schedule the assignment of the illustration teacher and the chairperson for the professional activities. Note that the illustration teaching schedule should be spread evenly across all grades and all subjects. Principals and vice-principals also participate in teaching illustration. The first illustration teacher was the principal; followed by vice principals, group leaders, and core - teachers. After scheduling illustration teaching, it is necessary to notify all teachers of the school and can adjust it to suit reality. If the school has less than 25 teachers, professional activities should be organized for the whole school. If the school has more than 25 teachers, it is recommended to organize professional activities in groups to ensure the conditions for the observer's position, enough time for everyone to share their opinions and thoughts. Try to mobilize all administrators and teachers to attend. In the first stage, when organizing professional activities, the whole school should be arranged together to practice how to do and build new habits. In the following mastering stage, it is possible to separate the organization of professional activities into groups if the school is crowded with teachers to increase the opportunity to express opinions for participants (Clivaz & Takahashi, 2018; Perry & Lewis, 2009; Saito et al., 2012). Besides, findings explored the experiences of novice teachers in crisis Covid -19 and clarify the challenges and career opportunities in two aspects supporting the construction of professional identity of young teachers.

Pedagogical aspects: A small part of the experimental time in Vietnam, K-12 students can study online at home due to the outbreak of the COVID-19 epidemic. The stories of novice teachers show that they were asked to change their teaching methods and break down the usual walls of space and time. The shift to online teaching methods through online forms of communication between teachers and learners: synchronous and asynchronous communication has emphasized the challenges and opportunities which they face to adapt individual and group teaching practice to

provide comprehensive solutions to learners' needs (Redman, 2015).

Technological aspects: Changes in time and space as the learning space moves from the school to the virtual realm and leads to different technical challenges and opportunities. Participants' stories explore the fact that novice teachers are required to learn and work with unfamiliar technologies. They are also forced to act on their own with little support from the professional community and tech support. It is assumed that novice teachers because they are younger, are technology-oriented. Researches also show that online teaching is more effective when teaching is conducted by young teachers under the guidance of teachers experienced in their subjects (Dvir & Schatz-Oppenheimer, 2020).

Nowadays, some developed countries such as Germany, France, England, America, Japan, The Philippines, and China have established programs to train young teachers. For example, the USA government has a specific scholarship called "Fullbright" for distinguished young teachers, especially those who are from developing countries, to aid them in their future teaching performances. These types of scholarships and other forms of teachers' training have the same aim, which is to motivate the young teachers to develop their professional capability to have a secure attachment to their teaching at the high school level (Tran et al., 2016).

The factors mentioned above also affect the development of the teaching capacity of young K-12 school teachers in Vietnam. With novice skills in the early years of their careers, young teachers may face many difficulties and need professional assistance, guidance, and expert supports from organizations and individuals, especially leaders and colleagues. According to recent surveys, there are 99.7% of young teachers in 17 high schools in 8 northern provinces of Vietnam (Ha Giang, Cao Bang, Lang Son, Bac Giang, Vinh Phuc, Nam Dinh, Thai Binh, and Thai Nguyen) and 100% of university-educated teachers currently working in high schools in 7 surveyed provinces (Vinh Phuc, Hai Duong, Thanh Hoa, Hanoi, Nam Dinh, Hoa Binh, Da Nang) need professional guidance during the probationary period (Duc, 2016). From the perspective of management, with the considerable importance of the early years of one's careers, education management and senior teachers are responsible for caring and guiding young teachers to improve the quality of their teaching. 100% of managers and heads of department in the two surveys stated "this is crucial and meaningful work" (Duc, 2016).

In Vietnam, young teachers in high schools are only guided by the professional team of their school. They do not receive specialized training programs to develop their occupational skills. The current instruction is: The principal has the primary responsibility, but usually assigns this to the department. The head of the department plans to support and guidance for young teachers in the first days. At the end of the probationary period, the department makes comments and assessments based on two main factors: professional skills and behaviors, before they become an official member at their high school (Duc, 2016).

Although young teachers do receive guidance and assistance from the principals, the department, and colleagues, there are still limitations and ambiguities in particular problems. Therefore, the effect of these guidances is still negligible. This explains why many teachers still having confusion and difficulties in dealing with students even after becoming official teachers at schools (Duc, 2016).

Professional development activities are a process of teachers participating in various stages from preparing, designing a lesson, demo teaching, self-evaluating and discussing what happened in a student's learning process. This is an activity of practical learning, a place to experience new things and connect theory with practice. This process allows teachers to gain professional improvements, which benefits their careers. Professional development activities following the Lesson Study model can change the perceptions of young teachers about the objectives, the contents, the methodologies and the teaching formats of a curriculum program, which should be suitable to specific targets, areas and teaching processes; help the young teachers orientate the evaluation process towards a positive way, or carry out student-centered activities to ensure the study chances of each student, thus, contribute to students' developments. These development activities also form a constructive and professional connection among colleagues, in which they are respected, supported, cooperated while maintaining career advancement opportunities.

Conclusion

Analyzing results through attending lessons, observing the teaching process in the experimental lessons, interviewing teachers and students show the progress in developing and implementing lesson plans of young teachers, and spontaneously teachers and students are very interested in applying the Lesson Study model. Most young teachers believe that every lesson applying the Lesson Study model helps students learn actively, stimulates learning interest, leading to improved quality of teaching than traditional one.

The analytical result shows that, applying the Lesson Study model has shown a significant result as all of their teaching performances are improved. The inferential results reveal that the teacher group who took part in the applying Lesson Study model had higher impact results than the group who did not apply this model. This difference is significant and the influence scale is from medium to large. The findings showed that the methods applied in this research bring effectiveness and possibility, which benefits the teaching capability of young Chemistry teachers in particular, and other teachers, in general.

Recommendations

Based on the findings of this study, we propose that the application of the lesson study model in high schools can assist in improving the professional capacity of young chemistry teachers. For example, lesson planning, motivate learners, classroom management, ... The improvement of each teacher's component competencies needs to be continuously developed and evaluated at a wider scale. In addition, further studies can be carried out on a diverse audience (not necessarily young teachers) because, in practice, we find that many older teachers are also interested and excited about the lesson study model. At the same time, the research can be carried out at other school levels (primary, middle school) and other subjects to contribute to improving the quality of education in Vietnam.

Limitations

There are several limitations that need to be considered in this study. The study was conducted in 5 mountainous provinces in the North of Vietnam. Homogeneity was achieved by including young Chemistry teachers from all 5 provinces in the study group. However, the selection is not made at random. During the time of participating in the study, with the consent of the school leaders and the volunteers of young teachers were taken into account. This adaptive study is limited to Chemistry teachers. Therefore, the validity-reliability status of the scale for young teachers of other subjects has not been taken into account. Furthermore, the number of teachers was limited; one group includes teachers teaching different grades. Thus, when one meeting discussed the material of grade 10, for instance, the teachers of the other grades learned from the discussion and designed their lessons by themselves.

Authorship Contribution Statement

Huong: Conceptualization, design, drafting manuscript, writing, final approval. Mau Duc: Design, drafting manuscript, statistical analysis, writing, final approval. Thi Thuy Quynh: supervision, editing. Thi Ngoc: material support, data analysis

References

- Abdullah, N. A., & Leung, F. K. S. (2019). Exploring teachers' values and valuing process in school-based lesson study: A Brunei Darussalam case study. In E. K. Davis, M. E. Carr, & E. Ampadu (Eds.), *Valuing in Mathematics Learning Amongst Ghanaian Students: What Does It Look Like Across Grade Levels?* (pp. 129–142). https://doi.org/10.1007/978-3-030-16892-6_6
- Bolling, M. Y., Terry, C. M., & Kohlenberg, R. J. (2006). Behavioral theories. In J. C. Thomas & D. L. Segal (Eds.), *Comprehensive handbook of personality and psychopathology* (Vol.1, pp. 142–156). John Wiley & Sons.
- Clivaz, S., & Takahashi, A. (2018). Mathematics lesson study around the world: Conclusions and looking ahead. In M. Quaresma, C. Winsløw, S. Clivaz, J. P. da Ponte, A. Ni Shuilleabháin & A. Takahashi (Eds.), *Mathematics lesson study around the world* (pp. 153–164). Springer. https://doi.org/10.1007/978-3-319-75696-7_9
- Coenders, F., & Verhoef, N. (2019). Lesson Study: professional development (PD) for beginning and experienced teachers. *Professional Development in Education*, 45(2), 217–230. <https://doi.org/10.1080/19415257.2018.1430050>
- Do, D. T., Le, C. L., & Giang, T. V. (2020). The correlation between internal quality assurance and the formation of quality culture in Vietnam higher education: A case study in Ho Chi Minh city. *European Journal of Educational Research*, 9(2), 499–509. <https://doi.org/10.12973/eu-jer.9.2.499>
- Duc, N. M. (2016). *Developing the pedagogical capability for students of chemistry - university of education through applied lesson research model*. Ha Noi University of Education.
- Duc, N. M., & Chien, H. T. (2014). Renovating the professional activities of teachers through the model of "lesson study" in Vietnam. *Vietnam Journal of Education*, 335(1), 36–39.
- Dvir, N., & Schatz-Oppenheimer, O. (2020). Novice teachers in a changing reality. *European Journal of Teacher Education*, 43(4), 639–656. <https://doi.org/10.1080/02619768.2020.1821360>
- Frernandesz, C., & Yoshida, M. (2004). *Lesson study: A Japanese approach to improving mathematics teaching and learning*. Routledge.
- Goh, R., & Fang, Y. (2017). Improving English language teaching through lesson study: Case study of teacher learning in a Singapore primary school grade level team. *International Journal for Lesson and Learning Studies*, 6(2), 135–150. <https://doi.org/10.1108/IJLLS-11-2015-0037>
- Inprasitha, M. (2011). One feature of adaptive lesson study in Thailand: Designing a learning unit. *Maitree Inprasitha Journal of Science and Mathematics Education in Southeast Asia*, 34(1), 47–66.

- Jhang, F. H. (2020). Teachers' attitudes towards lesson study, perceived competence, and involvement in lesson study: evidence from junior high school teachers. *Professional Development in Education*, 46(1), 82–96. <https://doi.org/10.1080/19415257.2019.1585383>
- Kieu, N. T. (2018). Using lesson study to develop the competence of designing math lesson plan for primary education students at Dong Thap university. *Vietnam Journal of Education*, 2(2018), 61–65.
- Lee, J. F. K. (2008). A Hong Kong case of lesson study-Benefits and concerns. *Teaching and Teacher Education*, 24(5), 1115–1124. <https://doi.org/10.1016/j.tate.2007.10.007>
- Lewis, C., & Perry, R. (2017). Lesson study to scale up research-based knowledge: A randomized, controlled trial of fractions learning. *Journal for Research in Mathematics Education*, 48(3), 261–299. <https://doi.org/10.5951/jresmetheduc.48.3.0261>
- Lewis, M. (2019). Mathematics lesson study around the world: theoretical and methodological issues. *Research in Mathematics Education*, 21(1), 100–104. <https://doi.org/10.1080/14794802.2018.1563563>
- Lim, C. S., Kor, L. K., & Chia, H. M. (2016). Revitalising mathematics classroom teaching through Lesson Study (LS): A Malaysian case study. *ZDM - Mathematics Education*, 48(4), 485–499. <https://doi.org/10.1007/s11858-016-0779-7>
- Luckin, R., & Du Boulay, B. (2016). Reflections on the Ecolab and the Zone of Proximal Development. *International Journal of Artificial Intelligence in Education*, 26(1), 416–430. <https://doi.org/10.1007/s40593-015-0072-x>
- Ministry of Education & Training. (2014a). *Documentary 5555 guiding professional activities on innovation of teaching methods and testing and assessment; organize and manage the professional activities of the high schools*. <https://bit.ly/3hnYHt7>
- Ministry of Education & Training. (2018). *Circular No. 20/2018 provides professional standards for K-12 school teachers*. 13. <https://bit.ly/3hlLGAm>
- Murooka, K. (2007). Current Status of Lesson Study in High Schools. In *Japanese Lesson Study in Mathematics*. https://doi.org/10.1142/9789812707475_0027
- Perry, R. R., & Lewis, C. C. (2009). What is successful adaptation of lesson study in the US? *Journal of Educational Change*, 10(4), 365–391. <https://doi.org/10.1007/s10833-008-9069-7>
- Radunović, D. (2014). On “Secondary Aesthetics, without isolation”: Philosophical Origins of Mikhail Bakhtin’s Theory of form. *Durham Research Online*, 2(2), 210–222.
- Redman, S. F. (2015). *Self-efficacy and teacher retention: perception of novice teachers on job preparation, job support, and job satisfaction* [Doctoral dissertation, East Tennessee State University]. Digital Commons @ East Tennessee State University. <https://dc.etsu.edu/etd/2611>
- Ruthven, K. (2005). Improving the development and warranting of good practice in teaching. *Cambridge Journal of Education*, 35(3), 407–426. <https://doi.org/10.1080/03057640500319081>
- Saito, E., Harun, I., Kuboki, I., & Tachibana, H. (2006). Indonesian lesson study in practice: Case study of Indonesian mathematics and science teacher education project. *Journal of In-Service Education*, 32(2), 171–184. <https://doi.org/10.1080/13674580600650872>
- Saito, E., Khong, T. D. H., & Tsukui, A. (2012). Why is school reform sustained even after a project? A case study of Bac Giang Province, Vietnam. *Journal of Educational Change*, 13(2), 259–287. <https://doi.org/10.1007/s10833-011-9173-y>
- Saito, E., & Tsukui, A. (2008a). Challenging common sense: Cases of school reform for learning community under an international cooperation project in Bac Giang Province, Vietnam. *International Journal of Educational Development*, 28(5), 571–584. <https://doi.org/10.1016/j.ijedudev.2007.12.006>
- Saito, E., & Tsukui, A. (2008b). Challenging common sense: Cases of school reform for learning community under an international cooperation project in Bac Giang Province, Vietnam. *International Journal of Educational Development*, 28(5), 571–584. <https://doi.org/10.1016/j.IJEDUDEV.2007.12.006>
- Schipper, T. M., de Vries, S., Goei, S. L., & van Veen, K. (2020). Promoting a professional school culture through lesson study? An examination of school culture, school conditions, and teacher self-efficacy. *Professional Development in Education*, 46(1), 112–129. <https://doi.org/10.1080/19415257.2019.1634627>
- Seleznyov, S. (2020). Lesson study: exploring implementation challenges in England. *International Journal for Lesson and Learning Studies*, 9(2), 179–192. <https://doi.org/10.1108/IJLLS-08-2019-0059>

- Stigler, J. W., & Hiebert, J. (2000). The teaching gap: Best ideas from the world's teachers for improving education in the classroom. *Journal of Curriculum Studies*, 32(6), 867–874. <https://doi.org/10.1080/00220270050167215>
- Tran, L. T. B., Ho, N. T., & Hurle, R. J. (2016). Teaching for creativity development: Lessons learned from a preliminary study of Vietnamese and international upper (high) secondary school teachers' perceptions and lesson plans. *Creative Education*, 7(7), 1024–1043. <https://doi.org/10.4236/ce.2016.77107>
- Tsukui, A., & Saito, E. (2018). Stroll into students' learning: Acts to unload teachers' values through the practices of lesson study for learning community in Vietnam. *Improving Schools*, 21(2), 173–186. <https://doi.org/10.1177/1365480217717530>
- Vui, T. (2015). Using lesson study as a means to innovation for teaching and learning mathematics in Vietnam: Research lesson on the property of the three medians in a triangle. In M. Inprasitha, M. Isoda, P. Wang-Iverson & B. -H. Yeap (Eds.), *Lesson study: Challenges in mathematics education* (pp.273–292). World Scientific. https://doi.org/10.1142/9789812835420_0018
- Widjaja, W., Vale, C., Groves, S., & Doig, B. (2017). Teachers' professional growth through engagement with lesson study. *Journal of Mathematics Teacher Education*, 20(4), 357–383. <https://doi.org/10.1007/s10857-015-9341-8>
- Williams, J., Ryan, J., & Morgan, S. (2014). Lesson study in a performative culture. In C. Day & J. Sachs (Eds.), *Workplace Learning in Teacher Education: International Practice and Policy* (pp. 151–167). Springer Netherlands. <https://doi.org/10.1007/978-94-007-7826-9>
- Xu, H., & Pedder, D. (2014). Lesson Study: An international review of the research. In P. Dudley (Ed.), *Lesson Study: Professional Learning for Our Time*. Routledge Research in Education. <https://doi.org/10.4324/9780203795538>
- Yetkiner, A., & Bıkmaz, F. (2019). Novice teachers' views on induction practices in Turkey. *International Journal of Curriculum and Instructional Studies*, 9(1), 91–122. <https://doi.org/10.31704/ijocis.2019.005>
- Yildiz, A. (2017). Reflections from the lesson study for the development of Techno-Pedagogical competencies in teaching fractal Geometry. *European Journal of Educational Research*, 6(1), 41–50. <https://doi.org/10.12973/eu-er.6.1.41>
- Ylonen, A., & Norwich, B. (2012). Using Lesson Study to develop teaching approaches for secondary school pupils with moderate learning difficulties: Teachers' concepts, attitudes and pedagogic strategies. *European Journal of Special Needs Education*, 27(3), 301–317. <https://doi.org/10.1080/08856257.2012.678664>
- Yoshida, M., & Jackson, W. C. (2011). Ideas for developing Mathematical pedagogical content knowledge through lesson study. In L. C. Hart, A. S. Alston, & A. Murata (Eds.), *Lesson Study Research and Practice in Mathematics Education* (pp. 279–288). Springer.