



Lesson study utilization in improving the teaching competence of physical education teachers at the elementary school level

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Abstract: This study aims to analyze the utilization of lesson study in improving the teaching competence of Physical Education (PE) teachers at the elementary school level. The lesson study process which consists of three main stages: planning, implementation, and collaborative reflection, was applied in the context of PE learning in several elementary schools. Participants in this study came from physical education teachers from the Palembang (Indonesia) area, totaling 10 elementary school PE teacher. The quality of learning is measured by looking at two aspects: teaching skills observed from recorded processes on how teachers managed the classroom and from students' formative class evaluation questionnaire after the learning process. The initial measurement and training on managing the classroom were given to the participating teachers before lesson study was conducted. Furthermore, the lesson study program was carried out for four cycles. The same measurement was taken before and after the lesson study was concluded. All data in this study were processed using IBM SPSS 27 with paired sample t-test analysis and effect sizes. The results of the study found that lesson study at the before and after stages was proven to significantly improve the quality of teacher teaching ($p < 0.05$), but not at the teaching skills ($p > 0.05$). The results showed that lesson study effectively helped PE teachers identify and correct weaknesses in their teaching, improve pedagogical skills, and facilitate more interactive and quality learning. In addition, lesson study also encourages the development of a collaborative culture among teachers, which contributes to improving professionalism and learning quality. This study concludes that lesson study is an effective strategy to improve the teaching competence of PE teachers at the primary school level, and it is recommended to be applied more widely in teacher development programs.

Keywords: lesson study, teaching skill, PE teacher, elementary school

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INTRODUCTION

The teaching skills of physical education teachers in Indonesia are influenced by various factors, including their professional competencies and the ability to prepare effective lesson plans. Research indicates that many physical education teachers lack adequate training in gymnastics management and sports coaching techniques, which hampers their teaching effectiveness (Herman Chaniago et al., 2024). Additionally, a significant correlation exists between teachers' skills in preparing higher-order thinking skills (HOTS) lesson plans and their overall teaching performance, with findings showing that proficient lesson planning contributes positively to teaching outcomes (Herman Chaniago et al., 2024). Furthermore, effective communication and teaching skills are crucial for enhancing teachers' professional competencies, as they significantly impact their performance (Widyaningsih et al., 2020). However, many teachers, particularly in private Madrasah Ibtidaiyah, do not possess the necessary educator certifications, which further limits their professional competence (Widyaningsih et al., 2020). To address these challenges, a structured professional development program is essential for upgrading teachers' skills and enhancing the quality of physical education in schools (Mu'arifin & Narmaditya, 2022).

Teaching skills in physical education are influenced by a variety of interrelated factors, including teacher behavior, communication, and professional development. Effective teacher-student interaction



is crucial, as teachers must act as motivators and guides, fostering an environment that encourages student participation and engagement (Gui, 2024). Additionally, the professionalism and attitude of teachers significantly impact their teaching effectiveness; they should employ diverse teaching methods and maintain a student-centered approach to enhance learning outcomes (Zhou, 2024). The development of essential skills, such as communication and methodological abilities, is vital for future physical education teachers, emphasizing the need for updated training programs that integrate practical and theoretical knowledge (Usonuulu & Momunaliev, 2024). Furthermore, teaching skills can be categorized into planning and implementation skills, with a focus on promoting student participation as a core objective (Gao & Song, 2019). Overall, these factors collectively shape the quality of physical education teaching and the professional growth of educators (Aparicio-Herguedas et al., 2023).

Key components of lesson study that facilitate professional development for physical education (PE) teachers include collaborative planning, critical reflection, and contextualized learning experiences. Lesson study involves small groups of teachers working together to design, implement, and evaluate a research lesson, which fosters a culture of collaboration and shared learning (Sato et al., 2020). This collaborative approach enhances teachers' understanding of effective teaching practices and encourages them to engage in critical reflection on their instructional methods, leading to improved teaching competencies (Fan & Zuest, 2024; Lamb & King, 2021). Additionally, the contextualization of lesson study within the specific environment of PE allows teachers to adapt their strategies to meet the unique needs of their students, thereby promoting a more effective learning atmosphere (Marques Santinha et al., 2024). However, challenges such as resistance to the concept of "study" and the lack of mutual observation among teachers can hinder its implementation (Shiraishi et al., 2022). Overall, when effectively executed, lesson study can significantly enhance the professional development of PE teachers (Borghouts et al., 2023).

Collaboration is a fundamental aspect of lesson study for physical education (PE) teachers, significantly enhancing their professional development and teaching practices. Through collaborative efforts, teachers engage in a cycle of planning, observing, and reflecting on lessons, which fosters mutual support and shared learning experiences (Richit et al., 2021, 2024). This process allows teachers to critically analyze their teaching methods and adapt them based on collective insights, ultimately improving student learning outcomes (Abdullah et al., 2023). In a study involving secondary PE associate teachers, participants reported that collaboration during lesson study helped them develop critical reflection skills and adapt their teaching approaches effectively (Bowles et al., 2023). Additionally, the collaborative design of lessons, as seen in hybridized models, enables teachers to tailor their practices to meet the specific needs of their students, promoting a more informed and autonomous engagement in physical activities (Dudley & Vrikki, 2019). Overall, collaboration in lesson study empowers PE teachers to enhance their competencies and foster a supportive learning environment.

Lesson study is a collaborative approach that has been widely applied in various educational contexts to improve teachers' teaching competencies. However, there is a distinct focus on understanding the effectiveness of lesson study especially in the context of physical education at the primary school level, where learning dynamics is more complex due to the variations in students' physical, social and emotional needs. In addition, some literature shows a lack of research that specifically explores how lesson study can be applied to address unique challenges in physical education teaching, such as active classroom management and basic motor skill development. Based on this, the purpose of this article is to explore and evaluate the utilization of lesson study in improving physical education teachers' teaching competencies at the primary school level, with a focus on developing effective and relevant learning strategies for students' needs.

METHODS

This type of research is action research, with stages: (1) workshop to teachers about lesson study; (2) observation of learning conducted by one of the teachers; (3) workshop on the development of learning components (plan); (4) implementation of open lesson and reflection (do & see); and (5) evaluation of lesson study activities. The learning process is recorded using a video camera for further analysis. After the lesson implementation, there will be a multi-directional discussion between the teacher and the observers. The instruments used were teaching skills checklist and formative class evaluation (FCE). The teaching skills checklist focused on the physical education teachers' skills in managing their

classroom. A total of 12 skills (Metzler & Colquitt, 2021; Silverman, 2011) were assessed by the assessment team by analyzing the instructional videos. The score was obtained by counting the number of times that the indicator appeared during instruction. Each skill consists of five indicators (activities). If one of the indicators appears then the teacher in the video scores 1. If the teacher completes all the indicators, then the total score is 60. The indicators used in the study were adjusted to the learning demands contained in the National Curriculum for Indonesia. The second instrument is FCE which is a questionnaire to measure the effectiveness of physical education learning by utilizing students' responses. The use of this questionnaire is considered valid and reliable in Japan and Indonesia (HASEGAWA et al., 1995; Suroto & Takahashi, 2005). The FCE questionnaire consists of nine items with four components: results, motivation, learning, and cooperation.

This research was conducted in a community of primary school physical education teachers at the sub-district level. 10 PE teachers consisting of 8 male teachers and two female teachers were appointed by their community to participate in the LS implementation. The method of recruiting them was (1) the researcher conducted a survey to several schools in Palembang (Indonesia), (2) the researcher sent an invitation to participate in the research via WhatsApp to the teachers; (3) the researcher recorded how many teachers were willing to participate in the research; and (4) the teachers were given information about the research and were required to make a statement of their willingness to participate in all LS program activities. The socio-demographics of the participants are presented in (Table 1).

Table 1. List of PE teachers in Plaju sub-district, Palembang

No.	Name	Sex	Age	Degree	Work Experience (years)
1.	Teacher 1	F	25	Bachelor	3
2.	Teacher 2	M	33	Bachelor	8
3.	Teacher 3	M	33	Bachelor	12
4.	Teacher 4	F	28	Bachelor	6
5.	Teacher 5	M	24	Bachelor	2
6.	Teacher 6	M	34	Bachelor	9
7.	Teacher 7	M	32	Bachelor	4
8.	Teacher 8	M	37	Bachelor	15
9.	Teacher 9	M	26	Bachelor	3
10.	Teacher 10	M	32	Bachelor	6

This research was conducted in three phases and lasted for three months. The first month was a preliminary assessment. The second months began with training in managing PE learning using LS. The training was aimed at discussing all indicators that must be achieved to achieve good quality instruction. Also, it informed the teachers on the standards of the National Curriculum for Indonesia. The second months was also a phase where the researchers implemented LS training for teachers, which consisted of mentoring and open classes. Each learning process was discussed with the researchers (as subject experts) and school principal/other supervisors to give correctional feedback. Teachers then used LS for four cycles. The third months is where the final assessment conducted. The LS program is presented in (Figure 1). The data analysis started with descriptive statistics (mean and standard deviation) followed by normality test Kolmogorov-Smirnov with $p > 0.05$. To determine the significance of value change, the researchers used an ANOVA.

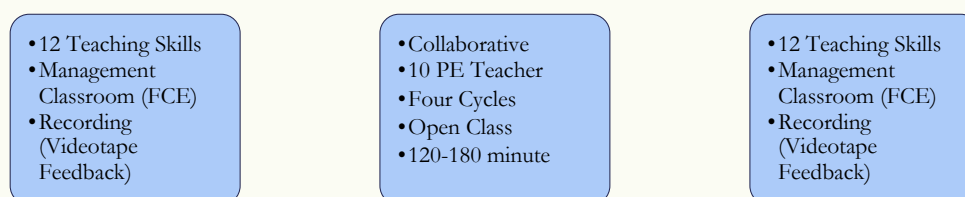


Figure 1. Lesson Study Model

RESULTS AND DISCUSSION

Results

The results of descriptive statistics are presented in Table 2. Table 3 shows no difference in TS and FCE values before and after LS.

Table 2. Descriptive Statistic FCE and Teaching Skills

		Formative Class Evaluation (FCE)					Teaching Skills		
		Result	Volition	Method	Cooperation	Mean	Criterion	Score	Criterion
Teacher 1	Before LS	2.89	2.94	2.35	2.97	2.79	Very Good	21	Poor
	After LS	2.98	2.94	2.53	3.00	2.86	Very Good	24	Poor
Teacher 2	Before LS	2.78	2.94	2.32	2.97	2.75	Good	31	Moderate
	After LS	2.89	2.94	2.46	2.97	2.82	Very Good	32	Moderate
Teacher 3	Before LS	2.91	2.95	2.59	2.97	2.85	Very Good	26	Moderate
	After LS	2.84	2.95	2.19	2.97	2.74	Good	29	Moderate
Teacher 4	Before LS	2.74	2.95	1.99	2.97	2.66	Good	15	Poor
	After LS	2.91	2.95	2.35	2.97	2.79	Very Good	17	Poor
Teacher 5	Before LS	2.82	2.95	1.99	2.98	2.68	Good	16	Poor
	After LS	2.94	2.95	2.40	3.00	2.82	Very Good	21	Poor
Teacher 6	Before LS	2.74	2.95	1.96	2.98	2.66	Good	16	Poor
	After LS	2.92	2.95	2.17	3.00	2.76	Good	21	Poor
Teacher 7	Before LS	2.72	2.94	2.05	2.97	2.67	Good	21	Poor
	After LS	2.78	2.94	2.32	2.97	2.75	Good	25	Moderate
Teacher 8	Before LS	2.74	2.94	2.23	2.97	2.72	Good	26	Moderate
	After LS	2.80	2.94	2.53	2.97	2.81	Very Good	30	Moderate
Teacher 9	Before LS	2.74	2.95	2.09	2.98	2.69	Good	23	Poor
	After LS	2.80	2.95	2.33	3.00	2.77	Good	28	Moderate
Teacher 10	Before LS	2.74	2.95	1.99	2.98	2.66	Good	28	Moderate
	After LS	2.78	2.95	2.10	3.00	2.71	Good	32	Moderate

Learning effectiveness was assessed during the learning process, in addition to content validity which is carried out before the learning process. The assessment was carried out in the form of an FCE questionnaire which was filled in by students shortly after the lesson. In general, according to the opinion of students in before and after LS, the effectiveness of the learning model was good. Meanwhile, for teaching skills, the average teaching skills of physical education teachers based on table 2 are in the moderate category.

Table 3. Difference value FCE and Teaching Skills Before and After LS

Variable	Correlation	t-stat	p-value	d
FCE	0.225	3.074	0.013	9
Teaching Skills	0.970	8.433	1.448	9

Based on Table 3, the T-test results show that there is a difference in FCE results before and after LS, while the teaching skills variable does not show a significant difference. Although teaching skills showed no difference, there was an improvement between the data before and after the LS.

Discussion

Lesson study significantly influences teacher professional development by fostering collaboration, enhancing reflective practices, and improving instructional strategies. Research indicates that teachers engaged in lesson study demonstrate increased efficacy and improved lesson planning skills, as evidenced by better performance in classroom delivery and reflective thinking (Al-Hattami & Bawaneh, 2024; Mengistu et al., 2024). The collaborative nature of lesson study allows teachers to address professional deficiencies and gain diverse perspectives, which contributes to their overall growth (Özbek & Öçal, 2024). Additionally, the development of a professional community through lesson study encourages teachers to take communal responsibility for each other's growth, thereby strengthening their collective practice (Ni Shuilleabhain et al., 2024). However, challenges such as a lack of administrative support can hinder the sustainability of lesson study practices, as seen in Myanmar, where the method's implementation has declined post-international projects (Win & Kovacs, 2024). Overall, lesson study serves as a powerful framework for ongoing professional development among educators.

The collaborative approach of lesson study significantly enhances the teaching skills of physical education teachers by fostering a culture of continuous professional development and reflective practice. This methodology encourages teachers to engage in collaborative work, allowing them to share insights and adapt their teaching strategies based on peer feedback and student needs, which is crucial for effective lesson planning and implementation (Marques Santinha et al., 2024). Additionally, the integration of cooperative learning strategies within lesson studies has been shown to improve various learning outcomes, including social and cognitive skills, thereby enriching the overall educational experience (Zach et al., 2023). Furthermore, the application of problem-based learning models within collaborative frameworks has been linked to enhanced collaboration skills among students, which in turn reflects positively on teachers' instructional methods and classroom management (Rahmadi et al., 2023). Overall, the collaborative nature of lesson studies not only supports teachers in refining their pedagogical approaches but also promotes a shared responsibility for student learning outcomes (Eruzun et al., 2024; Evangelio et al., 2024).

Lesson study significantly influences physical education (PE) teacher professional development by fostering collaborative learning and critical reflection among educators. This methodology allows teachers to work together in designing, implementing, and evaluating lessons, which enhances their teaching competencies and promotes ongoing learning (Jones, 2024). Research indicates that teachers who engage in lesson study demonstrate improved professional practices, including better lesson planning and delivery (Mengistu et al., 2024). Additionally, lesson study has been shown to positively impact teacher behavior, such as increasing autonomy support in the classroom, although its effects on student motivation remain less pronounced (Borghouts et al., 2023). Despite some limitations, such as the need for structured conditions to facilitate participation, the overall findings suggest that lesson study is a valuable approach for continuous professional development in PE, helping teachers adapt their methods and improve their effectiveness (Marques Santinha et al., 2024; Slingerland et al., 2021).

Lesson study can significantly enhance student engagement in physical education (PE) classes by fostering a collaborative and reflective teaching environment. This approach allows teachers to work together in designing and evaluating lessons, which can lead to improved teaching practices and a more engaging learning experience for students (Talaghir et al., 2023). Research indicates that when teachers participate in lesson study, they develop a deeper understanding of effective teaching strategies, which can translate into more dynamic and interactive PE lessons (Borghouts et al., 2023). Additionally, integrating Information and Communication Technology (ICT) into lesson study can further boost student engagement by providing timely feedback and facilitating discussions, making lessons more relevant and interactive (Chia et al., 2019). The application of innovative models, such as STEAM within lesson study, has also shown to enhance student creativity and collaboration, leading to increased participation and interest in PE activities (Suharniwati et al., 2024). Overall, lesson study promotes a continuous cycle of improvement that benefits both teachers and students in PE settings.

CONCLUSION

The results showed that the utilization of lesson study significantly contributed to improving the teaching competence of PE teachers at the elementary school level. Through the collaborative process of planning, implementing, and reflecting, PE teachers are able to identify areas that need improvement,

improve pedagogical skills, and be more effective in delivering learning materials. Lesson study also encourages a more reflective and collaborative learning culture among teachers, which in turn has a positive impact on improving the quality of learning and student learning outcomes. Thus, the implementation of lesson study is an effective approach to develop the professional competence of PE teachers in elementary schools.

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