

Adopting Lesson Study on Job Training in Toyama School Japan to Biology Education School Field Introduction Program

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ABSTRAK

Lesson study diterapkan sebagai salah satu metode untuk meningkatkan keterampilan mengajar calon guru pada saat praktik mengajar di sekolah. Indonesia menggunakan istilah Pengenalan Lapangan Sekolah (PLP) untuk kegiatan praktik mengajar di sekolah, sedangkan di Jepang digunakan istilah On Job Training (OTJ). Penelitian ini bertujuan untuk menganalisis perbedaan metode Lesson Study yang dilakukan di perguruan tinggi di Indonesia dan Jepang, kemudian mengadaptasi metode Lesson Study OTJ untuk diterapkan pada mata kuliah PLP II. Metode penelitian dilakukan dengan observasi langsung dan tidak langsung. Observasi tidak langsung melalui channel YouTube praktik pembelajaran Lesson Study pada PLP II di salah satu perguruan tinggi. Observasi langsung dan wawancara mendalam dilakukan kepada OTJ di SMP Afiliasi Universitas Toyama Jepang. Adaptasi OTJ Jepang dilakukan dalam tiga tahap. Tahap pertama dilakukan di dua sekolah di Jakarta dan Depok dengan melibatkan dua guru dan delapan siswa. Tahap kedua dan ketiga dilakukan di salah satu sekolah di Depok yang melibatkan satu guru dan empat siswa. Hasil penelitian menunjukkan adanya perbedaan antara pembelajaran yang dikembangkan di Indonesia dan Jepang. OTJ di Jepang menekankan pada kolaborasi dan kerjasama antar calon guru dalam meningkatkan keterampilan mengajar. Sedangkan dalam PLP di Indonesia, penekanannya adalah pada kolegalitas antara calon guru, guru pamong, dan dosen pembimbing. Penerapan OTJ Jepang pada PLP II Pendidikan Biologi menunjukkan bahwa metode ini dapat meningkatkan rasa percaya diri calon guru-siswa, meningkatkan kreativitas metode dan media pengajaran.

ABSTRACT

Lesson study is applied as a method to improve the teaching skills of prospective teachers when teaching practice in schools. Indonesia uses the term School Field Introduction (PLP) for practical teaching activities in schools, while in Japan, the term On Job Training (OTJ) is used. This study aims to analyze the differences in lesson study methods practiced in universities in Indonesia and Japan, then adapts the lesson study method OTJ to apply in the PLP II course. The research method was carried out by direct and indirect observation. Indirect observation is through the YouTube channel of lesson study practices on PLP II at one of the universities. Direct observation and in-depth interviews were conducted with OTJ at Japan's Affiliated Toyama University Junior High School. The adaptation of the Japanese OTJ was carried out in three stages. The first was conducted in two schools in Jakarta and Depok, involving two teachers and eight students. The second and third were conducted in one school in Depok, involving one teacher and four students. The study results show differences between lessons developed in Indonesia and Japan. OTJ in Japan emphasizes collaboration and cooperation among prospective teacher in improving teaching skills. Meanwhile, in PLP in Indonesia, the emphasis is on collegiality among prospective teachers, tutor teachers, and supervisor lecturers. Applying the Japanese OTJ to PLP II in Biology Education showed that this method can increase prospective teacher-students' confidence, improve creativity in teaching methods and media.

1. INTRODUCTION

The lesson study was developed in Japan. This practice has been practiced in Japan since the Meiji Era. This practice has been carried out in Japan until now and has even become a critical method of Japanese educational culture to improve the teaching skills of teachers (Aizawa et al., 2023; Elliott, 2019; Sari et al., 2020). Generally, three lesson study patterns are used in Japan: preparation and planning sessions, learning study sessions, and review sessions. This simple lesson study pattern has become popular in Japan. Lesson study focuses on changing motivation through student observation (Coenders & Verhoef, 2018; Nurjaya & Wulandari, 2023). The changes that occur in students are the effect of positive changes from the teacher. In other words, lesson study is a model that focuses on teacher professional development through investigating their practice. Lesson study research often focuses on what teachers learn from lesson study (Jansen et al., 2021; Mutiani et al., 2020). Some studies examine the benefits of lesson study for teachers. Lesson study improves learning design because experienced teachers with more PCK (Pedagogy Content knowledge) can contribute to observations (Coenders & Verhoef, 2018). In addition, teachers can reflect independently because lesson study provides opportunities for collaborating in preparation, implementation of learning in class, discussion after class, and observing students in other teacher classes. Lesson studies can stimulate teachers to apply cognitive and metacognitive-based learning activities (Mok & Staub, 2021; Vermunt et al., 2019). Lesson study can improve the skills and motivation of teachers because of the collaboration in the lesson study team (Amintarti et al., 2020; Sucilestari & Arizona, 2019; Sugandi, 2019). Review based on observation activity in lesson study helped teachers monitor student activities more thoroughly. Lesson study improves teaching readiness and student activity.

The practice of lesson study in Indonesia was adopted by Japanese experts working for the IMSTEP (Indonesian Mathematics and Science Teaching Education Project). After being developed, implemented, and disseminated through the JICA technical cooperation program (SISTTEMS and PELITA). Currently, lesson study has spread widely in various regions in Indonesia. In addition, lesson study is disseminated through BERMUTU (Better Education Through Reformed Management and Universal Teacher Upgrading) and the Beginner Teacher Induction Program (PIGP). Lesson study is also used as a strategy to improve the quality of lectures for prospective teachers at universities (LPSTK) through LEDIPSTI (Lesson Study Dissemination Program for Strengthening Teacher Education in Indonesia) (Ibrohim, 2012; Putra et al., 2021). Lesson study is not only applied to teachers but also the education of prospective teachers to improve their skills. The pattern of lesson study applied in Indonesia is generally a three-stage cyclic pattern, i.e., plan (make a lesson plan), do (implementing a lesson plan), and see (reflecting and discussing the implementation of lesson plan).

Lesson study research on prospective teacher-students in Indonesia showed that lesson study can improve the abilities and skills of prospective teachers in designing, implementing, and evaluating learning. Lesson studies also provide direct experience to prospective teachers, especially for implementing the learning tools that have been made. Lesson study was more effective than microteaching (Kawaguchi & Iwata, 2021; Mase, 2021). Some universities in Indonesia have implemented lesson study in the School Field Introduction Course (PLP) or educational internships. However, implementing lesson study in PLP is rigid and formal. Lesson study at universities in Indonesia, which seems rigid and formal, makes lesson study challenging to do in every practice or during PLP. Lesson study in PLP was not a daily activity in practice teaching and learning in school during PLP, but only introducing what lesson study is and trying to feel joined in lesson study activity during PLP (Arifin & Gultom, 2016; Hidayat Ara, 2012).

Lesson Study in Japan and Lesson Study outside of Japan are not the same. In Japan, lesson Study means designing, teaching, observing (or analysing), commenting on, reflecting on and improving a lesson for teacher professional development and also for curriculum and instruction studies (Kim, 2021; Mutakinati et al., 2018). Outside of Japan including Indonesia, lesson study means teachers collaboratively plan, observe, and analyse actual classroom lessons or that teachers conduct a sequence of collaborative reflective practice (Dudley, 2019; Lewis et al., 2006). Based on this definition, it appears that lesson study in Japan occurs naturally as a daily activity, but outside Japan, lesson study is a manipulative treatment. This difference seems to influence the rigid and formal implementation of lesson study in PLP.

The application of lesson study in PLP has been carried out by several researchers in Indonesia. The lesson study pattern used in these studies generally uses the definition of lesson study as prospective teachers collaboratively plan, observe, and analyse actual classroom lessons (Arifin & Gultom, 2016; Kusumawati, 2016). The weakness of the lesson study applied in PLP so far is that it needs to be more flexible, structured, and formal. Applying study lessons with a pattern that has been done previously means that the frequency of study lessons is rarely applied in PLP because study lessons are not a daily

activity in teaching practice. Even though the lesson study pattern in Japan is flexible, there is no standard pattern for implementing lesson study in Japan. Lesson Study in Japan has many patterns because the approach has only a loose, common goal, which is improving the classroom activities and students' learning, but the process is not strictly defined (Kawaguchi & Watanabe, 2021; Mase, 2021). So, it is urgent to make more in-depth observations on how lesson study is applied to apprenticeship practices in Japanese schools by prospective teachers. It is hoped that in-depth observation will produce a new lesson study pattern in implementing PLP that is more flexible and less rigid. It will also be applied more often in PLP as a daily activity in practicing teaching skills.

This study aims to analyze the pattern of Lesson Study applied at a university in Japan on the job training (OJT) as a teacher in school, the difference between School Field Introduction (PLP) Lesson study applied at a university in Indonesia, OJT lesson study from Japan was adopted and implemented to PLP II in Biology Education Program Study in UIN Jakarta. Novelty of this study lies on adopting lesson study on job training in Toyama school Japan to biology education school field introduction program that has never been researched before.

2. METHOD

The research used a mixed method, sequential explanatory strategy carried out longitudinally from 2018 to 2023 (stopped momentarily during the COVID-19 pandemic emergency in 2021-2022). The stages of the research carried out are shown in Table 1. It can be seen that the sequential explanatory strategy used is QUAL-quan (Creswell, 2014).

Table 1. The Mix Method with Sequential Explanatory Strategy

Type of data	The Strategy of Collecting Data
QUAL	<ul style="list-style-type: none"> • Direct and indirect observation of lesson study implementation in Japan and Indonesia. • Observations and interviews on adopting the OTJ lesson study pattern in PLP II (New lesson study style).
quan	Achievement test for students who have learned biology in PLP II with a new lesson study style.

The subjects of observation were students carrying out teaching practice at school. At a school in Toyama, Japan, observation subjects were selected from Toyama University students practicing teaching science in class. Toyama is one of the cities in Japan that routinely applies lesson study as a method of teacher preparation. The subject of indirect observation is the practice of PLP at UM Malang. The subjects of the implementation of the adoption of OTJ Japan lesson study were students in the 8th semester of Biology Education at PLP II at a South Jakarta City Madrasah Aliyah school and a Depok Senior High School. The choice of school implementation was based on the willingness of students and tutor-teachers to implement PLP with the new Lesson Study style. The interview subjects were teachers, lecturers, and students directly involved in Lesson Study activities at OTJ and PLP. The method used in data collection is observation, interviews, and testing. The research focused on implementing lesson study through OJT in Japan, PLP II in Indonesia, and the adoption of OJT in PLP II at Biology Education Program Study UIN Jakarta. Table 2 shows the focus, place, and technique of data collection.

Table 2. Focus On Research, Place, and Data Collection Techniques

Focus of research	Place	Data collection technique
OJT in Japan	Toyama University, Japan	Direct observation on OJT in Fuzuoka Junior High School (Affiliated School Toyama University). Interview: teacher, prospective teachers, and lecturer.
PLP II in Indonesia	Malang University, Indonesia	Indirect observation PLP II: UM youtube Channel .
Adoption OTJ Toyama Japan on PLP II in Tadris Biologi	UIN Syarif Hidayatullah Jakarta, Indonesia	Direct observation on PLP II at Senior High School (MA Pembangunan, Affiliated School

Focus of research	Place	Data collection technique
Effect of PLP with Lesson Study on Students's achievement	SMAN 5 Depok	UIN Jakarta and SMAN 5 Kota Depok) Interview: teacher and prospective teachers. They were testing for students taught by prospective teachers in PLP II.

The research took place from 2018 to 2023. Details of the time data sources research subjects are shown in [Table 3](#). The table shows three steps of the qualitative method and the last step with the quantitative approach.

Table 3. Time, Data Resource, Research Subject, and Sum of Object Observation

Time of research	Data resource	Information/research subject	Sum of object
September 11-12 2018	Direct observation Science learning in Fuzouoka Yuniior High School interview	Prospective teacher-students from Toyama University who did OJT Teacher of Fuzouka School Biology Prospective Teachers of Toyama University Lecture from Toyama University	Three groups, 12 prospective teachers One person One person One person
	Indirect observation	University Malang YouTube Channel	One video
Febuari-April 2019	Direct observation Biology learning in MA Pembangunan and SMAN 5 Depok interview	Biology Prospective Teachers from Tadris Biologi UIN Jakarta Teacher of MA Pembangunan Teacher of SMAN 5 Depok	Two groups (8 people) One person One person
	Direct observation Biology learning in SMAN 5 Depok Interview	Biology Prospective Teachers Tadris Biologi UIN Jakarta	One group (four people)
Febuari-Maret 2020	Direct Observation in SMAN 5 Depok	Biology Prospective Teachers Tadris Biologi UIN Jakarta Teacher form SMAN 5 Depok	One group (4 person) Two person
	Test for Biology Concept	Students of SMAN 5 Depok	217 students

3. RESULT AND DISCUSSION

Result

Negishi Sensei explained that the On Job Training (OJT) at Toyama University was five credits divided into one credit for debriefing and four in the school field. The debriefing consists of two sessions: debriefing at schools and universities. The debriefing was carried out a month before teacher-students entered the school field. The schedule and materials for one credit are shown in [Table 3](#).

Table 3. The Debriefing Schedule and Material

Debriefing location	Speaker	Time (minute)	Material
University	Lecturer	90	Student guiding
		90	Teacher Profession ethics
		90	Teaching practice
		90	Teaching practice
School	Teacher	90	Teaching practice

Debriefing location	Speaker	Time (minute)	Material
		90	Student guiding
		90	Moral education*

*) Moral Education in Japan is compulsory, with one hour of learning (50 minutes) per week. There are no special teachers of moral education. All teachers, including teachers of science, must teach moral education.

OJT takes time for three weeks at school, but before practice and after practice, there are guidances. The OJT schedule by Toyama University can be seen in [Table 4](#).

Table 4. School Field Schedule

Time	Activity
August	Teaching observation (3 days)
August	Pre and post-teaching practice guidance
August, 29 – September, 19	In collaborative teaching practice in class, one group consists of 4 teacher students.
Oktober	Post-teaching practice guidance

Base on [Table 4](#), 70 teacher-students from Toyama University took OJT at Fuzouka School from some departments. This research focuses on science learning observation. Learning was carried out in the laboratory. Students were seated in groups at their respective desks, and one group consisted of 4 students with a balanced gender proportion, namely two men and two women. Nine groups of junior high school students were in the laboratory (36 students). There were four teacher students, one person acted as a model teacher and three people acted as supporting teachers who help students technically. The science teacher was present in the class to observe the OJT process.

The OJT students explain the procedures in the laboratory and guide students to do practical work. [Figure 1](#) showed a prospective teacher as a teacher model, explaining to the students (pictured on the right, the model teacher was facing students).



Figure 1. Learning and Teaching Science by Teacher-Students on the Job Training, One Student Acts as a Model Teacher.

[Figure 1](#) show other Prospective teachers assist the model teacher in guiding students in group work. After the prospective teachers implemented their teaching in the classroom, the teacher reviewed the science teaching activities with the one group (four students). We then participated in a review session that lasted from 10.51 – 11.31 (approximately 40 minutes required for this activity). In this review, the teacher begins by asking about the model teacher's feelings and reflections on his shortcomings. In contrast, a model teacher reflects on what things are still not optimal in his teaching. Then asked the same thing from friends who help model teachers and guide students. [Figure 2](#) shows the discussion session and learning review. The teacher at school (looking forward) guided the learning review session directly. The prospective teachers in one group numbered four people with the same appearance in class (looking back). Interviews with the tutor teacher got some information. They discussed based on the existing syllabus and created ideas on how to represent it, what topics to choose, how to teach it, and so on. Then, the lesson plan was consulted with the tutor teacher. The tutor teacher gave some ideas on their lesson plan. One lesson plan can be discussed 3-5 times with the tutor teacher. A group of four students share roles during teaching. They take turns choosing who will be the model teacher. If one group performs 10 times, then one person will teach 2-3 times. [Figure 3](#) shows a

prospective teacher's role as a teacher model (left); the role of other prospective teachers is to observe their friend as a teacher model (right, two prospective teachers as observers).



Figure 2. The Tutor Teacher Gave Reviews of the Teaching of Teacher Students



Figure 3. Lesson Study in Indonesia PLP: A Prospective Teacher as a Model Teacher, The Others as Observers. Teacher, Supervisor Lecturer, and Prospective Teacher are Equal Collegiality

Base on [Figure 3](#), the model teacher and the observers reflect on the learning done, using discussion. Before the discussion, the supervisor and Prospective teachers agree on who will be the moderator, and notes are written, then the moderator leads the discussion. In the first stage, the moderator opened the discussion, the second stage the moderator asked the model teacher to convey how he felt before, during, and after teaching. The three moderators were asked to re-explain the course of the teaching process. The four moderators asked the model teacher to self-assess the level of success. The five moderators asked the observers to explain their observations in turn. The six moderators asked the model teacher to respond to the observers' explanations. The seventh asked other students to express their opinions. The eight moderators and the participants formulate valuable activities that can be taken from the lesson study. Finally, the note written presented a summary note of the reflection discussion. The moderator ended the discussion. After the lesson study, the tutor teacher and supervising lecturer conduct clinical supervision of the learning carried out by the model teacher. All Prospective teacher-students recorded comments, input, and criticism from clinical supervision activities to be used as learning materials in the next activity. Observations of each lesson study stage carried out directly in Japan and indirectly through YouTube recordings in Indonesia can be seen in [Table 5](#).

Table 5. Observation Lesson Study in Japan OJT and Indonesia PLP II

Step	Japan OJT	Indonesia PLP II
Planning	Teacher-students made a lesson plan, and then worksheet then prepared learning media collaboratively. These learning tools were discussed with the tutor-teacher on the possibility of the application and communicated with the supervisor. Teacher-students made a schedule for teaching in front of the class and supporting teachers. The observers only tutor-teacher and supervisor lecture without teaching students.	Teacher-students, teacher, and supervisor lecturer discuss and make lesson plans, which include the learning model/strategies and media. After that, determine who the model teacher and observer were. The observers consist of teacher-students, tutor-teacher, and supervisor-lecturer.
Implementing	Teacher-students as model teachers	There is one model teacher who

Step	Japan OJT	Indonesia PLP II
	teach in front of the class, and other teacher-students as supporting teachers help during group activities and record student learning activities. As observers, Teachers and supervisors observe model teachers' teaching and its impact on students.	performs the lesson plans, and the other teacher-students become observers along with the tutor teacher and supervisor. They focused on observing the student learning activities, not the teacher's teaching.
Review and discussing	They were discussing the 'multilog' way. The position of teacher-students as learners. Teacher-students did self-reflection as model teachers, supporting teachers gave comments, and the tutor teacher gave some review based on his observations. The results of the review notes are used by other students in the next turn.	An agreed moderator led the discussion. Consists of two activities, namely lesson study activities and clinical supervision. Teacher-students, tutor teachers, and supervisors are in equal positions in lesson study activities. In clinical supervision activities, the student's position is the person being guided.

Base on [Table 5](#) the stages of lesson study in OJT and PLP II are the same, namely planning (plan), implementation (do), and review (see). The differences can be seen in [Table 6](#).

Table 6. The Differences in Lesson Study Between Japan OJT and Indonesia PLP II

Steps of Lesson Study	OJT Japan	PLP II Indonesia
Planing	Planning was done collaboratively and cooperatively among the prospective teachers.	Planning was done collegially and cooperatively between the prospective teacher tutor, teacher, and supervisor lecturer.
Do	Prospective teachers implemented the lesson plan collaboratively as a team teaching.	Prospective teachers implement the lesson plan like professional teachers, model teachers, and observers in open lessons.
See (Reflection)	The review session was done naturally. The position of prospective teacher-students as learners, not colleagues. Prospective teacher-status are a team of teachers who get some review from the tutor, teacher, and lecturer.	The discussion was done formally, in rigid and collegiality circumstances. Prospective Prospective students observed the lesson have the same position with a tutor, teacher, supervisor, and lecturer.

Base on [Table 6](#), Japan OTJ showed the lesson study was done within cooperative and collaborative learning circumstances. The view of prospective teachers is that PLP II Indonesia showed that the lesson study was done within individual and collegial circumstances. In PLP II, students were played as model teachers and observers. Teacher-students as observers have an equal position or collegiality with the tutor-teacher and supervisor-lecturer when observing. However, in OJT students act as model teacher and supporting teachers. Prospective teachers is teacher-students, they are learners or trainees, not collaborating partners with the tutor and supervisor. The difference between PLP II with and without adopting Japan OJT in Biology Education Program Study UIN Jakarta is show in [Table 7](#).

Table 7. The Difference Between PLP II With and Without Adopting Japan OJT in Biology Education Program Study UIN Jakarta

	Without adopting Japan OTJ (conventional)	With adopting Japan OTJ (Lesson Study)
Practice of teaching	A prospective-teacher teach in one or several classes individually	Four prospective-teachers teach in some classes collaboratively
Planing	A teacher-student makes a lesson	Four Prospective teacher-students made

	Without adopting Japan OTJ (conventional)	With adopting Japan OTJ (Lesson Study)
	plan individually, and consults it with the tutor, teacher, and supervisor lecturer.	lesson plans collaboratively and cooperatively. They consult it with the tutor, teacher, and supervisor lecturer. They discussed and made the schedule for who become a model teacher and the supporting teachers.
Implementing	Every prospective teachers do the lesson plan. The teacher, and supervisor lecturer observe and assess her/his performance.	A model teacher does the lesson plan. The others become supporting teachers who help a model teacher and guide the students. The tutor teacher and supervisor lecturer observe the implementation of lesson plan.
Reviewing	The teacher, and supervisor lecturer assess the performance and give criticism. Teacher, and supervisor judge the performance of students.	Lecturer asked students as model teachers and supporting teachers to do self-reflection. Teachers and lecturers suggest improving the teaching method, learning media or worksheet for the next performance.
Characteristics	Individual	Cooperative and collaborative

Period January-March 2020 PLP II Lesson Study adoption of Japanese OTJ (after this referred to as the new style lesson study PLP II) was implemented at SMAN 5 Depok. The new style lesson study PLP II activity is daily teaching practices that do collaboratively and cooperatively. In every practice in the class, a prospective teacher become a model teacher and others become supporting teachers that help and guide students in learning. Because it is 'daily teaching practical' in Table 8, it can be seen that each student has the opportunity to perform 14-16 times as a model teacher. These 14-16 performances have fulfilled the requirements to pass teaching practice activities. The PLP II guidelines state the minimum of practice teaching in the class is 12 times. Schedule of PLP II in biology subject is show in Table 8.

Table 8. Schedule of PLP II in Biology Subject

Topic	Subtopic	Schedule	Science and Mathematics Class of 11st Grade					
			1	2	3	4	5	6
Excretory system	Excretory organs and structures	21-22 Januari	F	F	F	S	H	A
	Excretory system and process	23-24 January	A	S	H	H	A	S
	Disorders of the Human Excretory System, and the Excretory System in Animals	27-29 Januari	H	H	A	A	F	H
	Urine Content Test Practicum	28-31 Januari	S	A	S	F	S	F
Coordination System	Nervous system	3-5 Februari	F	F	F	S	H	A
	Sense System	4-7 February	A	S	H	H	A	S
	Hormone System	11-12 Febuari	H	H	A	A	F	H
	Practical Blind Spot Test and Taste Mapping on the Tongue	11-14 Febuari	S	A	S	F	S	F
NAPZA	Types of Drugs	17-19 Febuari	H	H	A	A	F	A
Review for mid test		18-21 Febuari	S	A	S	F	S	F

After the end of the covid19 pandemic, the new style lesson study was reapplied in PLP II at SMAN 5 Depok. The purpose of its application is to see the effect of lesson study on student learning

outcomes. The principle of new style lesson study was consistently applied to PLP II 2023, namely planning and implementing learning (plan and do stage) in collaboration and cooperation, students in one class are taught by four prospective teachers. This lesson study pattern is applied to two biology topics in grade 10 secondary school: Plantae and Animalia. The application of the new style lesson study pattern can be seen in Table 9.

Tabel 9. The Pattern of New Style Lesson Study PLP II

Stage	Implementation	Note
Plan	Prospective teachers who did new style lesson study are: S, E, L, T grouped into one group. The prospective teachers made lesson plans collaboratively and consulted with tutor teachers and lecturers.	Learning planning consists of lesson plan, worksheet, quiz, and learning media (ppt slide). [Plantae material of teaching: https://drive.google.com/drive/folders/1d8MkuDirYB4ma2VP2oR1zPNC3j8Zofrr?usp=share_link] [Animalia material of teaching: https://drive.google.com/drive/folders/1Fcvz7_26vjj1fVD1AroIS66D4dHRlvs1?usp=share_link]
Do	Prospective teachers taught in class, one person becomes a model teacher, the others become supporting teachers, the observers in this activity are tutor teachers and supervisor (lecture). The model teacher's schedule in lesson study activities can be seen in Table 10.	Implementation of learning activities with a new style of lesson study can be seen in the recording: https://youtube.com/playlist?list=PLUSFbQNY2ZjLkvrX7YtAuCZ7bj5tRE5d5 .
See	The prospective teachers, tutor teachers, and lecture carried out discussion activities. Starting with the feelings and experiences of the model teacher in providing teaching, the supporting teacher also provides things that are felt difficult, and the learning that is obtained from the appearance of his friend as a model teacher. Furthermore, tutors and lecturers provide comments and suggestions for further teaching and learning in class.	

In Table 9 it can be seen that there were two topics was taught, namely plantae in 1st meeting, and Animalia (invertebrates and vertebrates) which were held in 2nd meetings. Both of these materials were given in a minimal time, only one time meeting in class. In the Plantae learning activities, students are given some task on worksheet and quiz question. Schedule of teaching in the new style lesson study PLP II is show in Table 10.

Tabel 10. Schedule of Teaching in The New Style Lesson Study PLP II

Topic	Days	Time	Science Class in 10 Grade				
			1	2	3	4	5
Plantae	Tuesday, 7/02/2023	07.50 - 10.00					S
	Wednesday, 8/02/2023	09.20 - 11.40					
		13.00 - 15.00		L			
	Thursday, 9/02/2023	13.00 - 15.00					T
Animalia Invertebrata and Vertebrata	Monday, 13/02/2023	09.20 - 11.40	S				
	Tuesday, 14/02/2023	07.50 - 10.00					E
		09.20 - 11.40				L	
	Wednesday, 15/02/2023	13.00 - 15.00			T		
		Thursday, 16/02/2023	13.00 - 15.00				
	Monday, 20/02/2023	09.20 - 11.40	E				
	Tuesday, 21/02/2023	07.50 - 10.00					L
		09.20 - 11.40				T	
Wednesday, 22/02/2023	13.00 - 15.00		S				
Thursday, 23/02/2023	13.00 - 15.00					E	

The impact of lesson study on students is carried out by assessing student learning outcomes. Two aspects are assessed: skills when doing practicum and knowledge when doing tests in class. The learning outcome results can be seen in [Table 11](#).

Table 11. Avarage and Standard Deviation of Learning Outcome

Topics	Aspects	Measure	Score of students in grade 10 Science Class				
			1	2	3	4	5
Plantae	Knowledge	Average	68.29	75.67	71.59	81.63	77.67
		STD	17.30	18.97	19.64	16.61	21.02
	Skill	Average	76.32	89.55	86.43	89.18	88.04
		STD	29.19	5.64	2.77	5.66	5.00
Animalia	Kowledge	Average	84.71	90.56	96.11	88.56	94.96
		STD	7.23	8.77	2.68	1.95	2.75
	Skill	Average	84.53	75	79.18	79.86	79.27
		STD	7.55	3.67	8.48	14.84	6.41

[Table 11](#) showed the mean grade X MIPA1 score is still below 70 for the knowledge aspect. [Table 12](#) shows 21% of students got the score less than 70. Based on the reflection and evaluation of Plantae learning, prospective teachers planned enrichment tasks in Animalia learning in addition to worksheets and quizzes with tasks to make posters and videos. Apart from that, quizzes are also held in class. Prospective teachers' ability to manage learning in animalia was better than before, because they reflect and continuously improve their appearance. Achievement of learning outcome is show in [Table 12](#).

Table 12. Achievement of Learning Outcome

Topics	Aspects	Score	Sum of students in grade 10 Science Class									
			1		2		3		4		5	
			n	%	n	%	n	%	n	%	n	%
Plantae	Knowledge	<70	10	25	9	22	14	32	4	9	7	16
		≥70	30	75	32	78	41	68	39	91	36	84
	Skill	<70	0	0	0	0	0	0	0	0	0	0
		≥70	40	100	41	100	44	100	44	100	43	100
Animalia	Knowledge	<70	0	0	1	2	0	0	0	0	0	0
		≥70	40	100	40	98	44	100	44	100	43	100
	Skill	<70	0	0	0	0	1	3	0	0	0	0
		≥70	40	100	41	100	37	97	44	100	43	100

[Tables 12](#) show the students' scores, especially for the knowledge aspect, increased compared to the previous learning outcome. Students who scored less than 70 also decreased, only 0.5%. New style lesson study activities that make PLP II students reflect on their learning activities and also have an impact on improving student learning outcomes.

Discussion

Based on observations and interviews found "lesson study pattern" in OJT Toyama University with the following stages planning, implementing, and riviewing. In planing, a group of teacher-students (4 people per group) makes a lesson plan together. In implementation, a group of prospective teachers chooses one person to teach in front of the class ([Erlina et al., 2022](#); [Raiyn, 2016](#)). The others become supporting teachers, they help the model teacher and individual learning guidance and observe student activities during learning. The teacher observed the teaching and learning carried out by the prospective teachers. In reviewing, at the end of the performance, the teacher gave the review and had a discussion with the prospective teachers. The position of all students in OJT or PLP II is a participant in school field practice, not a professional who can assess the impact of teaching on student activities in learning. The second difference is in the lesson study procedure. Lesson Study procedures at PLP II in Indonesia are formal and collaborative in collegiality. This procedure makes Lesson Study challenging to use as a 'daily teaching practice' during PLP II. So, The PLP II should conduct lesson study at least twice as a model teacher ([Arifin & Gultom, 2016](#); [Huertas-Abril, 2021](#)). The OTJ in Japan is simple as daily teaching practice, every week students will have their turn as model teachers and supporting teachers. Lesson study PLP II in Indonesia is formal and collegiality is also seen in the plan, do, and see stages. Teachers, lecturers, and students are considered co-workers. Students, teachers, and supervisors also make a lesson

plan during the planning stage. In the do stage, students who act as observers have the same position as teachers and supervisors. In the see stage, the selected moderator attempts to get the other students to equal with the tutor, teacher, and supervisor lecturer as if they were co-workers (Doig & Groves, 2011; Lewis et al., 2006). In contrast to OJT Lesson Study in Japan, teachers and supervisors continue to function as directors who motivate students to work independently, collaborate, and work together to improve teaching skills from planning to implementing the teaching in the classroom.

The other difference between PLP lesson study, which is usually carried out in Indonesia, and the new style of PLP adopted by Toyama is the relationship between prospective teachers, teachers, and lecturers during the implementation of lesson study. In PLP Lesson Study in Indonesia, the relationship between prospective teachers, teachers, and lecturers during the implementation of lesson study is collegial (Rosdiana et al., 2020; Seyihoglu & Kartal, 2010). Teachers, lecturers, and student teachers collaborate in planning, observing, and revising learning during lesson study. As for the new style of PLP adopted from Toyama, the relationship between prospective teachers and teachers and lecturers is hierarchical. In Japan, Teachers and lecturers are advisors when prospective teachers conduct lesson studies in teaching practice. The prospective teachers collaborate in teaching practice using a lesson study pattern (Doig & Groves, 2011; Mase, 2021). The differences in the relationship between teachers, lecturers, and students in lesson study teaching practices in Indonesia and Japan are depicted in the picture below. The circle depicts lesson study activities in Indonesia and Japan in teaching practices. The picture showed that teachers, lecturers, and prospective teachers have equal positions in implementing lesson study in Indonesia. In contrast, in Japan, where prospective teachers carry out lesson study, the positions of teachers and lecturers supervise the implementation of lesson study.

In the planning stage of UM, prospective teacher as a teacher model, lecturer, teacher, and other students in the same study program held discussions to develop a lesson plan. They discussed choosing suitable learning models, learning media, and so on. After the learning plan was agreed upon, the next step was determining the observers, namely the lecture, teacher, and several prospective teachers. In the do stage of UM, implement the design agreed upon in the discussion at the planning stage (Simamora et al., 2019; Wahyuningsih et al., 2023). Before teaching, the model teacher conditions students in the class to prepare learning materials and media and others, then teaching according to the plan. The observers see and observe the teaching process. Observations are carried out in a standing position and are focused on student learning activities, not on teaching activities. The observers made notes about student learning activities by the observation format that had been prepared.

This research shows that the use of lesson study influences student learning outcomes. The research results are by other research. The use of lesson study has a significant impact on student learning outcomes (Ayra & Kösterelioglu, 2021; Dudley, 2019). The new style of PLP adopted from OTJ Toyama emphasizes collaboration between prospective teachers. Collaboration between prospective teachers is the main difference from PLP, which other researchers in Indonesia generally develop. For example, the recent research on the PPL-THLS (Triple Helix based Lesson Study) model still uses the definition of lesson study as conducted by a group of educators in designing, observing, and revising learning (Ilhami et al., 2023; Satriani et al., 2018). The PPL THLS model emphasizes the collaboration of the teacher, lecturer, and pre-service teacher.

The implications of this research provide an overview of how lesson study in biology education programs can expand effective teaching methods to other educational environments. Lesson Study can improve the quality of teaching through teacher collaboration, structured reflection, and curriculum adjustments. Teachers can expand skills through participation in Lesson Study, leading to continued professional development. However, this research has limitations, because lesson study comes from the Japanese context which has a unique educational culture. Not all aspects of this practice can be easily adopted without consideration of the cultural and institutional context of other countries.

4. CONCLUSION

Japan OJT conducts a lesson study model that focuses on student collaboration, which is emphasized to improve teaching skills as learners. In contrast to the PLP II Lesson Study in Indonesia, students are considered equal to professionals, so Lesson Study seems formal, rigid, and unnatural. Applying the Japanese adaptation of OJT in Tadris Biology shows that lesson study is carried out naturally as a daily teaching practice. The practice of adoption lesson study Japan OJT (new style lesson study PLP II) is suitable to apply for prospective teacher (bachelor degree, Level 6), which emphasizes improving teaching skills as a learner, not a professional teacher. New style lesson study PLP II got some positive responses from teachers and prospective teachers. Stage of lesson study 'plan do see' as reflective activity makes improving for prospective teachers' professional development. It also impacted to students'

outcome learning. Score students, especially for knowledge aspect, student scores increased rapidly as prospective teachers continued to improve their teaching.

5. REFERENCES

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