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IMPLEMENTATION OF THE LESSON STUDY CYCLE IN PROJECT-BASED LEARNING TO ENHANCE DIGITAL LITERACY

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Abstract

This study aims to describe the implementation of the Lesson Study for Learning Community (LSLC) cycle within Project-Based Learning (PjBL) and to analyze its impact on student engagement and digital literacy. The low level of students' ability to utilize technology for academic purposes and for developing the competencies of prospective educators constitutes the primary background of this research.A descriptive qualitative method with a descriptive-analytic approach was employed. The research subjects were third-semester students of the Tadris Mathematics Study Program at State Islamic University Sulthan Thaha Saifuddin Jambi. Data were collected through questionnaires and digital observation sheets administered via Google Forms, and product assessment rubrics in the form of English-based mathematics E-Student Worksheets (ESW). Data analysis was conducted through the stages of data reduction, data display, and inductive conclusion drawing.The results indicate that the implementation of the Plan–Do–See cycle within PjBL contributed positively to the learning process. The integration of digital technology, such as the use of the Canva platform in proposal preparation and project development, was proven effective in enhancing students' digital literacy, particularly in searching for, evaluating, and critically creating digital learning content. Furthermore, collaboration within a learning community fostered reflective skills, critical thinking abilities, and teamwork in producing high-quality and relevant instructional products.

Keywords: Collaboration; Digital Literacy; ESW; LSLC; PjBL

1. INTRODUCTION

The educational process serves as a means for self-development, which is a system consisting of input, process, and output [1]. Input is the stage of preparing for the implementation of learning activities, the process is the series of implementing learning activities, and output is the result of the implementation of learning activities [2]–[4]. The achievement of national education goals cannot be separated from the process of implementing learning activities [5]. The implementation of learning needs to be designed by considering models, methods, approaches, or strategies that are appropriate so that effective learning activities can be realized [6].

Project-based learning (PjBL) combined with collaborative learning can be an alternative to designing enjoyable learning, one of which is by designing learning using the lesson study cycle [7]. Lesson study is a model of teacher development through collaborative and continuous learning design guided by the principles of collegiality [8] [9]. Lesson study comprises three stages in its implementation, namely the planning stage (plan), the implementation stage (do), and the reflection stage (see). In lesson study, teachers can evaluate the learning activities that have been carried out by considering feedback, suggestions, and active communication from observer colleagues to the model teacher so that the learning process, which becomes the object of the open class, can run effectively and learning objectives can be achieved [10].

The rapid advancement of information technology demands the education world to adapt as well, including in terms of improving digital literacy [11]. Digital literacy is not merely the ability to use technological devices, but also encompasses the ability to access, evaluate, manage, and create digital information critically, ethically, and responsibly. University students, as future

educators in the 21st century, are expected not only to be technology users but also to be able to utilize it productively in the learning process and academic life [12].

One approach considered effective in developing 21st-century skills is Project-Based Learning (PjBL[13]. PjBL emphasizes active involvement of students in completing real projects that are relevant to their lives, thereby providing an opportunity for direct application of digital technology. However, the implementation of PjBL also requires careful planning and evaluation to run optimally [14]–[16]. This is where lesson study becomes an appropriate supporting strategy. Lesson study, with its plan–do–see cycle, allows lecturers to design, implement, and reflect on teaching practices collaboratively and continuously.

By integrating the Lesson Study Learning Community (LSLC) into project-based learning, it is expected that lecturers and students can collaboratively create a more reflective, adaptive, and technology-based learning process [17]. This study uses a descriptive qualitative approach to examine how the lesson study cycle can strengthen the implementation of PjBL in enhancing students' digital literacy. The focus of this study is not only on learning outcomes but also on the process, collaborative dynamics, and changes in learning practices that occur during the cycle [18]–[20].

Based on initial observations of learning that takes place in higher education, all efforts have been made by educators, in this case, lecturers, to achieve the objectives of the lectures themselves. Therefore, by applying LSLC in classroom learning, it can be considered one of the efforts to achieve learning success. The implementation of LSLC is also expected to improve students' digital literacy. Digital literacy can train students to think critically, communicate, collaborate, and be creative. The digital era as it is

developing today poses a challenge for students in terms of the importance of improving digital literacy. Digital literacy is an important foundation for achievement in academics and preparation for an increasingly dynamic and connected world of work, so it is not just an additional skill. Thus, this research aims to be able to answer how the implementation of the lesson study cycle in Project-Based Learning is carried out and its impact on students' involvement and active participation in digital-based project activities.

2. RESEARCH METHOD

The type of research used is descriptive qualitative research. Qualitative research is a research procedure that produces descriptive data in the form of written or spoken words from people and observable behavior. Qualitative research is a type of research capable of describing how the implementation of the lesson study cycle in Project-Based Learning is carried out and its impact on student engagement and active participation in digital-based project activities.

The research subjects in this study were the third-semester students students of the Mathematics Education Program at State Islamic University Sulthan Thaha Saifuddin Jambi. During the implementation, they were assisted by one lecturer who taught the course, and some students acted as model groups consisting of 3 people per group, while the rest served as observers, totaling 24 people. The research subjects chosen as samples are considered to be individuals who can provide information relevant to the focus of the study.

This study uses a descriptive qualitative research approach. The research instruments are questionnaires and observation sheets. The questionnaires are designed to obtain quantitative data regarding students' understanding of the Lesson Study Learning

Community (LSLC) concept, the implementation of LSLC based on digital literacy, and its impact on project-based learning processes. The questionnaires are given to students who act as model group students and observer students after participating in the entire series of LSLC activities. The research instrument grid for the model group and observer students' questionnaires includes aspects of understanding the concept and implementation of LSLC, use of technology and digital ethics, as well as outcomes and impacts on learning [21], [22].

In addition to the questionnaire, this study also used an observation sheet. The observation sheet was used to obtain data regarding the implementation of LSLC during the learning process. Observations were conducted by students acting as observers, focusing on students' learning activities, learning interactions, and the application of the LSLC stages, which include Plan, Do, and See. This observation sheet was not used to assess individuals, but to document the learning process objectively. To support the digitalization of learning, the questionnaire and observation sheet were packaged in digital form using Google Forms.

The data analysis technique used in this study is described in three stages, namely data reduction, data presentation, and conclusion.

3. RESULTS AND DISCUSSION

Overall, the findings indicate that the implementation of Lesson Study Learning Community (LSLC) based on digital literacy integrated with project-based learning contributed positively to students' learning processes and outcomes. Through the collaborative and reflective implementation of the Plan, Do, and See stages, students were actively involved in planning, implementing, and evaluating learning activities, particularly in the development of English-based mathematics Electronic Student Worksheet (ESW).

The preparation stage began by collecting information, references, and relevant literature, conducting needs analysis through observation, and preparing research instruments. Needs analysis conducted through preliminary studies and discussions with lecturers and students indicated the necessity of collaborative, reflective, and digital literacy-based learning to enhance learning quality, particularly in developing English-based mathematics ESW. The analysis revealed that previous learning practices were still predominantly conventional, with limited technology utilization and reflection. Based on these findings, research instruments were developed, including questionnaires, observer observation sheets, and ESW product assessment rubrics aligned with LSLC, PjBL, and digital literacy indicators.

Following the preparation stage, the study entered the implementation stage, which served as the core of the research. This stage involved applying LSLC based on digital literacy through project-based learning, actively engaging students as model participants and observers to observe, reflect, and evaluate learning implementation and product quality. The implementation was preceded by LSLC dissemination sessions. The implementation stages are illustrated in Figure 1.

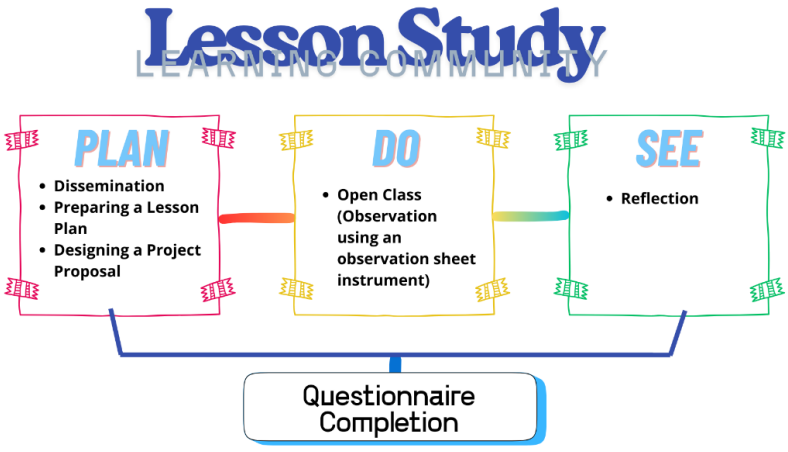


Figure 1. Flow of LSLC Implementation Stages

The Plan stage involved dissemination of LSLC concepts to research participants to enhance their understanding of LSLC principles and practices. During this stage, lecturers and students collaboratively designed project-based learning plans focused on developing English-based mathematics ESW. Planning activities included defining learning objectives, structuring project workflows, assigning group roles, and establishing product assessment criteria. Students actively identified relevant digital learning resources such as academic articles, instructional videos, and sample digital ESW, demonstrating early-stage digital literacy engagement. Learning tools, including lesson plans, initial ESW drafts, and observation instruments, were prepared digitally. Students also developed project proposals using the Canva platform, enabling collaborative online document design and real-time editing[23].

The Do stage, conducted during the second and third weeks, involved students developing ESW based on the prepared designs, documenting their work processes through project logbooks, and utilizing various digital platforms. Lecturers and observer students conducted open-class observations to examine learning activities, team collaboration, and digital literacy utilization. Model groups presented their proposals, project logbooks, and ESW drafts, allowing for initial feedback.

Observation results indicated that the developed ESW met expected quality standards. "Mathematical concepts were aligned with the curriculum and were systematically presented. The use of English demonstrated grammatical accuracy, appropriate mathematical terminology, and clear instructions. The ESW design exhibited good readability, structured layouts, and appealing visuals, enhancing student engagement. Additionally, the ESW incorporated real-life contexts and promoted critical thinking

through challenging activities. The development process also reflected effective team collaboration.

The See (reflection) stage was conducted in the fourth week through an open reflection session involving lecturers, model students, and observer students using the Zoom platform. Digital reflection facilitated flexible, collaborative, and well-documented discussions supported by digital artifacts, observations, and recorded learning processes. [24]. Reflection focused on strengths and areas for improvement related to mathematical accuracy, English usage, contextual relevance, and visual design. Reflective discussions resulted in recommendations for ESW revision.

Following the completion of the Plan–Do–See stages, questionnaires were administered to collect students' perceptions and experiences. The average questionnaire score from observer students was 84.86, categorized as "very good," while model group students achieved an average score of 87.22, also categorized as "very good." These findings indicate that students' perceptions, understanding, and experiences regarding LSLC-based digital literacy and project-based learning were highly positive.

shown in the graph below for the distribution of its acquisition.

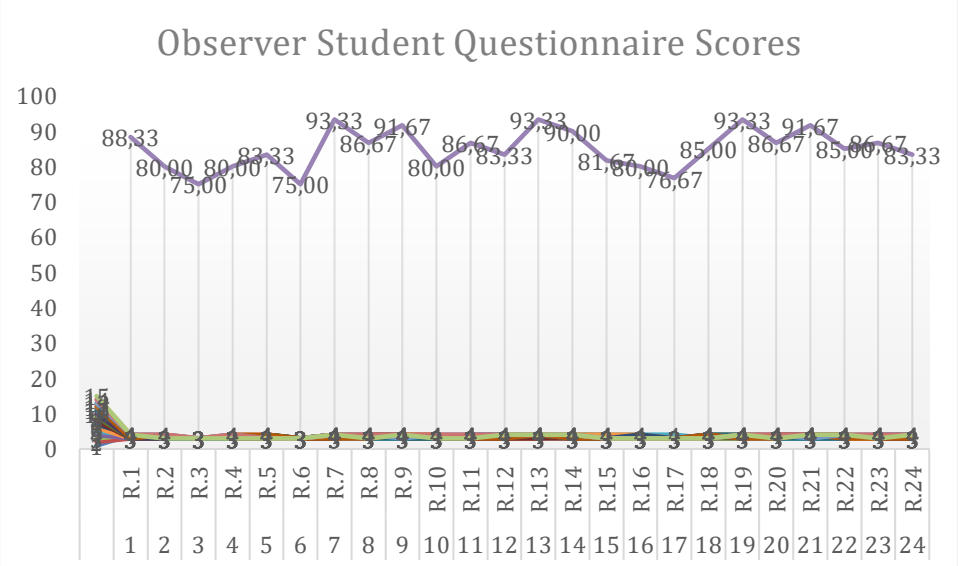


Figure 2. Average scores from the student observer questionnaire results

The average percentage score obtained from the students in the model group was 87.22 with a category of "very good." This is shown in the graph below for the distribution of the scores.

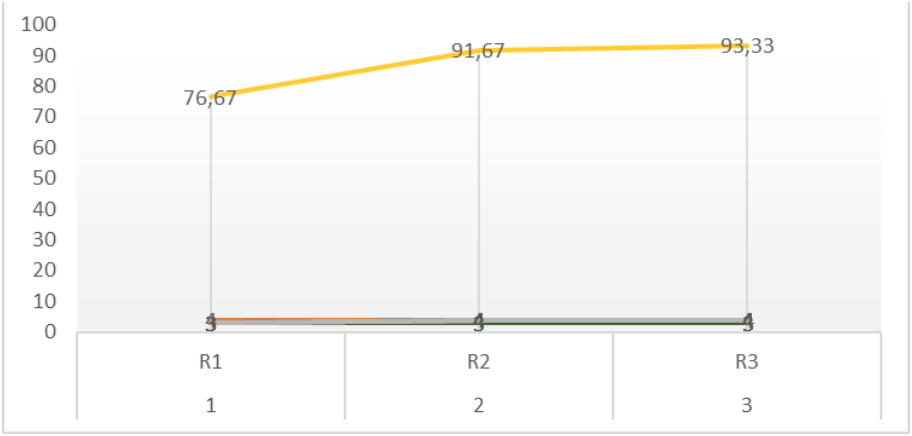


Figure 3. Average score of the student questionnaire for the model group

It can be concluded that students' perceptions, understanding, and experiences regarding the implementation of LSLC based on digital literacy and project-based learning are very good..

4. CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

1) The implementation of the Lesson Study cycle, consisting of Plan, Do, and See stages within project-based learning, was conducted systematically and effectively. The Plan stage involved collaborative project planning, lesson plan development, assessment rubric design, and digital LKPD proposal preparation. The Do stage included LKPD development, project logbook utilization, and open observations. The See stage was conducted through digital-based collaborative reflection. The Lesson Study cycle integrated effectively into project-based learning.

2) The implementation of Lesson Study positively impacted students' engagement and active participation in digital project-based activities. Students actively participated in planning discussions, product development, team collaboration, and learning reflection. The integration of digital technology across learning stages fostered students' creativity, responsibility, and active involvement. Thus, digital-based Lesson Study effectively enhances meaningful student participation in project-based learning.the

4.2 RECOMMENDATIONS

It is recommended that the implementation of Lesson Study Learning Community (LSLC) based on Project-Based Learning (PjBL) and digital literacy be expanded to other courses to strengthen collaborative and reflective learning practices. Future research is suggested to employ broader research designs or experimental quantitative approaches to measure the impact of LSLC on student learning outcomes more comprehensively.

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