

## Advancing Educational Innovation: Teacher Assistance in Implementing Project-Based Learning for MPLB Teachers in East Java

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### ABSTRACT

The community service program aims to enhance both knowledge and skill to implement project-based learning (PjBL) in learning activities. This training has attended 112 teachers who are members of the subject teacher council (MGMP) office management and business services (MPLB). The activity was divided into offline and online activities, including in-class workshops and online assistance with planning, practicing, and evaluating projects. During in-class workshop, the teacher was very enthusiastic and active to share their experience and challenges to implement PjBL, especially creating relevant projects. The teacher also provides the positive feedback through the questionnaire that indicates this training can improve their competency. Moreover, other activities such as online assistance also help the teacher to write a draft for implementing the PjBL in the module. Finally, this community service program enhances teachers' ability to implement PjBL as an innovative learning method that may improve the quality of education that is in line with Sustainable Development Goals.

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## **INTRODUCTION**

The complexity of work requires students to master both theory and skills such as critical, creative, and collaborative thinking. Teachers play a strategic role in enhancing the learning success and competence of vocational high school (SMK) graduates, ensuring they are ready for work. Teachers need to implement the learning methods that combine both theory and practice to achieve learning goals. The project-based learning (PjBL) approach is a relevant method that effectively combines both theory and practice in industry settings. Despite the inclusion of PjBL in the curriculum, its implementation poses significant challenges for many teachers.

One of the main obstacles to implementing PjBL is limited knowledge regarding the concept and steps that link the theory to the relevant project. Kokotsaki et al. (2016) revealed that many teachers feel less confident in implementing PjBL in the classroom due to their lack of understanding of the concept and the lack of adequate training and professional support. In addition, Harmer & Stokes (2014) showed that limited access to relevant learning resources and concrete examples of PjBL caused teachers difficulty in adopting this method effectively. Furthermore, Chang & Lee (2010) and Dias-Oliveira et al., (2024) mentioned that the successful implementation of PjBL depends on the readiness of teachers in designing relevant projects as well as adjusting learning strategies. Prince & Felder (2006) highlighted that providing case studies and practical supporting materials significantly enhances teachers' confidence in both designing and implementing project-based learning.

The lack of planning and evaluation in integrating theory with appropriate projects may lead to unsuccessful learning outcomes, particularly in critical thinking and student skills (Basalamah et al., 2022). Moreover, the obstacle is also exacerbated by the lack of real cases and practical guidelines that can be used as references in project design. Previous studies, such as Ahmad et al. (2023), show that the gap between the school's curriculum and practical experience in the industry may cause the skill to become irrelevant to future career needs. Moreover, Harmer & Stokes (2014) revealed that limited access to relevant learning resources and determining projects for PjBL implementation often make it difficult for teachers to adopt this method effectively. Prince & Felder (2006) also emphasized that providing study cases and supporting materials can significantly increase teachers' confidence in designing and implementing project-based learning. This situation can also affect students' confidence in facing the challenges of work readiness, which requires not only theoretical understanding but also problem-solving skills. According to Nilsook et al. (2021), vocational teachers have to update learning management in the current era to develop students' skills, especially in the context of vocational education, which focuses on practical skills. Moreover, Chu et al. (2021) also explained the importance of authentic experiences in supporting the development of 21st-century skills.

Despite these findings, previous studies mostly focus on identifying the obstacles of PjBL implementation rather than examining the importance of teacher assistance to overcome these challenges to increase teacher competency.

There remains limited empirical evidence on how both training and monitoring, especially those provided by universities, can enhance teachers' competence in designing, implementing, and evaluating PjBL. Moreover, there are a few studies exploring the specific needs of MPLB, for instance, the difficulties in creating project scenarios that align with industry demands. This gap highlights the need for research that investigates how the training program can effectively strengthen PjBL implementation among vocational teachers.

Therefore, training and practical guidance are needed to improve teachers' competence in designing, implementing, and evaluating project-based learning effectively. Universities, as institutions of higher education, can contribute to the effective implementation of project-based learning (PjBL) by offering intensive support to teachers. This support can help educators better understand the concepts and principles of PjBL through specialized guidance workshops designed for teachers. Finally, this study aims to address the existing gap by investigating the impact of training and assistance in enhancing the teacher competency in implementing PjBL for MPLB teachers in East Java.

## IMPLEMENTATION AND METHODS

The community service involved 112 teachers of the MGMP Office Management and Business Services Program in East Java. The PKM held in July - August 2025. The training will consist of three class sessions over three weeks and four weeks of assistance in developing module. The method describes the steps in implementing the proposed to solve the problem. The stages can be seen in the Table 1. The study analyses the pre-test and post-test using a paired sample t-test. The requirement for a paired sample t-test is to evaluate the normality test; if the data cannot fill normality, the data will be analysed using the Wilcoxon Signed-Rank Test. This study also analysed N-Gain scores to evaluate learning improvement as well as the effectiveness of instructional methods.

Table 1. Methods of Implementing Community Service

No	Stage	Activities	Indicator of Success
1	Preperation	<p>a. Identify the needs and conditions of teachers throught a preliminary survey</p> <p>b. Preparation of training meterials on PjBL</p>	<ul style="list-style-type: none"> <li>• Coordination and interviews with partners.</li> <li>• Agreement on training implementation.</li> <li>• Agreement on training schedule.</li> <li>• Training meterials compiled</li> </ul>
2	Implementation	<p>a. Understanding the concept of PjBL</p> <p>b. Adjustment of the project to learning outcomes.</p> <p>c. Development of PjBL Instruments.</p>	<ul style="list-style-type: none"> <li>• The attendance of training participants (teachers) during the activity.</li> <li>• Interactive discussions between participants and resource persons during the activity.</li> <li>• Participants</li> </ul>

			understand the material presented.
3	Mentoring	<p>a. The development of project-based learning modules under the guidance</p> <p>b. Implementation of PjBL in the class</p>	<ul style="list-style-type: none"> <li>• The learning modules are structured.</li> <li>• Implementation of PjBL follows the established stages.</li> </ul>
4.	Evaluation	Collecting feedback from participants	Suggestions from participants regarding the implementation of training activities.

## RESULTS AND DISCUSSION

The implementation of community service is divided into four activities, such as preparation, implementation, assistance, and evaluation.

### *Preparation*

The initial stages, such as preparation, play an important role in the success of the community service program. This stage aims to ensure that the program is in line with the needs of participants and they can achieve the goals, including mastering the implementation of PjBL. Firstly, we identified the needs and analyzed the condition of MGMP teachers through preliminary observation and preparing training material for PjBL. The results indicated that teachers require supplementary activities, such as training, to improve their competence in implementing the syntax of PjBL and writing the model within learning activities. Therefore, the teacher needs both training and assistance to improve their knowledge, develop the learning material, and writing the PjBL module. Secondly, we arranged the training material and practice to write the PjBL module as follows: 1) The basic concepts of PjBL. 2) The syntax for implementing PjBL in accordance with subjects taught in vocational high schools. 3) Strategies for conducting evaluations that align projects with learning outcomes. 4) Practical activities on developing module that include a syllabus, teaching materials, and evaluation components.

### *Implementation*

This stage is the main port of community service program. The purpose of this activity is to improve the competence of MGMP MPLB teachers in East Java in understanding, designing, and implementing the PjBL model in accordance with the subjects taught at vocational school. This activity was conducted offline on July 12–19, 2025. There were 112 teachers who participated in the event held at Hotel Bisanta Bidakara in Surabaya.

This training was conducted through blended learning, including in class learning and online assistance. During in class learning, the trainer explained material related to the PjBL learning model, as follows: 1) Understanding the concept of the PjBL learning model. 2) Determining projects with their respective elements as well as learning outcomes. 3) Developing PjBL assessment

instruments. At the beginning of the training, a pre-test was conducted to measure the teachers' abilities, and then after the material was explained, a post-test was conducted to measure how well teachers could catch the material that was delivered during the class section. The average pre-test and post-test scores were 52.7 and 77.23, respectively, while the average N-Gain score was 0.5, which is categorized as moderate.



**Figure 1. Pre-test section and delivered material in-class section**

### *Intensive Mentoring*

The mentoring was focusing on the development of teaching modules and assessments based on Project-Based Learning (PjBL). This mentoring activity aims to help teachers understand the steps in designing PjBL-based learning that is relevant to the learning outcomes at the MPLB Vocational School Program. In addition, the assistance also supports teachers in applying the material they have learned to classroom activities by integrating it into determining projects, collaboration, and reflection that making the learning process more contextual.

Mentoring was conducted online using Google Drive to share drafts and feedback. Teachers were divided into twelve groups and selected one as the best group for intensive mentoring. The documents they uploaded received feedback from the mentoring team. This strategy was implemented to speed up the revision process. The expected outcome of the mentoring activity was PjBL-based modules and assessments.

#### a. Evaluation

The results of in-class activities and intensive mentoring for MGMP MPLB East Java teachers on PjBL modules and assessments show a significant increase in teachers' understanding and skills in designing PjBL tools. Supported by the

results, the average post-test score increased significantly compared to the pre-test, from 55.77 to 77.23, respectively. systematically, relevant to learning outcomes, and aligned with the characteristics of vocational school students. Teachers also understand how to integrate PjBL elements, such as project planning, collaboration, and reflection, into teaching and learning activities that may make the learning more active and meaningful.

Table 2. The category of N-Gain score for pre-test and post-test

Category	Total Participant	Percentage (%)
Low	22	20
Medium (Moderate)	70	62
High	20	18
	112	100

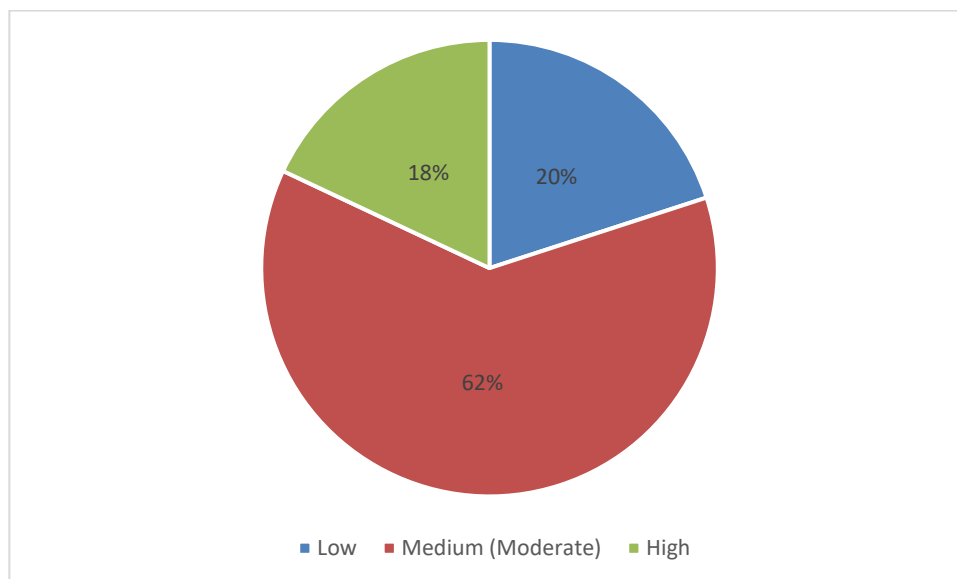


Figure 2. The percentage of N-Gain score of pre-test and post-test

Figure 2 shows the N-Gain scores that were obtained from the difference between the post-test and pre-test scores. Based on these scores, it can be seen that the moderate category dominates with 62%, followed by the average category with 20%, and the highest category is the high category with 18%. This indicates that most participants experienced a moderate increase in learning outcomes, leading to the conclusion that the training significantly enhanced their understanding of the PjBL concept, even though it did not result in a substantial increase in learning outcomes. Regarding the results, a small number of participants were able to absorb the material very well, as seen from the N-Gain category results of 18% in the high category. A small portion, namely 20% of participants, were in the low category, thus requiring additional assistance so that they could understand the PjBL learning model.

This study analyzed the pre- and post-test using non-parametric tests such as Wilcoxon signed-rank test due to the data did not fill a normal distribution. The Wilcoxon signed-rank test was conducted to examine the difference between pre- and post-test scores. Regarding Table 3, the results remain that 103 teachers experienced increasing scores, whereas no teacher showed decreasing scores,

while 9 teachers still have no change in both pre- and post-test scores. The results indicated a strong tendency that the teacher knowledge was improved after the class section. The results show that there is a significant difference between pre- and post-test scores ( $p$ -value = 0.0001). The median of post-test results has a higher score compared to the pre-test score.

Table 3. The result of Wilcoxon signed-rank test

Statistic	Value
Number of respondents (N)	112
Positive ranks	103
Negative ranks	0
Ties	9
Z-value	-8.867
p-value (Asymp. Sig. 2-tailed)	0.0001
Median (Pre-test)	50
Median (Post-test)	80

The result of this training is not only measured by the teachers' learning outcomes but also by their response to the training implementation. Participants' responses were measured using a questionnaire with a 1-5 Likert scale. The indicators of participant responses were measured based on several aspects, including the relevance of the material to teacher's needs, the competence of facilitators or trainers, facilitation strategies and methods, training media, materials and facilities, as well as the perceived benefits and implementation. The results of the analysis of the training participants' response questionnaire are presented in Table 4.

According to the participant's responses, the results indicate that most participants responded positively to the implementation of the activities. The teachers assessed that this training helped them in understanding the basic concepts and implementation steps of PjBL, particularly in the context of developing teaching modules and authentic assessments in vocational schools. In addition, participants felt that the material presented was relevant to classroom learning and easy to apply in real situations. In terms of the strategies and methods employed, namely blended learning, were evaluated as very good. Likewise, the media, material, and facilities that provided during the training were also rated very good.

Table 4. The results of participant response

No.	Indicator	Average Score	Category
1	The relevance of the material to teacher's needs	4,7	Very good
2	Competency of facilitators/trainers	4,6	Very good

3	Strategies and method	4,7	Very good
4	Media, materials, and facilities	4,7	Very good
5	Benefit and implementation	4,6	Very good

According to the questionnaire, it was suggested that the participant extend the training duration because it was conducted for only a relatively short time. Moreover, some teachers also suggest doing follow-up sessions, for instance, intensive technical guidance, to deepen their understanding and obtain more concrete examples of PjBL implementation. Finally, it can be concluded that the results of the participant response evaluation show that this PKM activity had a positive impact on increasing teachers' knowledge, motivation, and ability to apply the PjBL model.

Overall, this training activity was deemed successful in improving the professional competence of MPLB teachers in developing PjBL modules and assessments. Teachers are more confident in applying project-based learning models in the classroom, as well as able to produce more creative learning tools. In the future, follow-up in the form of further assistance or module revision clinics is needed so that the quality of PjBL implementation in schools can be optimized and have an impact on improving student learning outcomes.

## **CONCLUSIONS AND RECOMMENDATIONS**

The community was designed to enhance vocational teachers' knowledge and skills in implementing project based learning (PjBL) in the form of training and mentoring. This training supported teachers in planning and evaluating PjBL by integrating theoretical concepts with relevant practical cases. Moreover, teachers were guided to develop PjBL-based learning modules that included appropriate project designs as well as assessment criteria aligned with their subject areas.

The teacher was high enthusiasm and active participation throughout the training, indicating increased motivation to apply innovative learning methods to improve learning outcomes. The teacher response that collected from questionnaire showed that most of teacher satisfied to the training material, training methods and training assistance. Finally, this training enhance both teacher competency and collaboration among teache at East Java that may increase learning quality in the vocational high school.

To mastering teacher competency in PjBL, this study encourages advance training in PjBL with combine both theory and practice such as designing learning material, handle the class effectively, and doing the assessment. Moreover, in the next advance training need to do intensive assistance to write their experince in PjBL implemented to the modle that may help other teacher to implement this method in the future. Ultimately, there is a pressing need to

improve collaboration among the teacher in business and management field to increase teacher pedagogy competency and professionalism in the digital era.

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