Improving Psychomotor Skills of Fashion Design Students through Project-Based Learning in Knitting Technique Material

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ABSTRACT

Objective: This research investigates how applying the Project-Based Learning (PjBL) approach affects students' cognitive performance in the subject of product creation using knitting techniques in Grade XI Fashion Design at VHS 8 Surabaya. **Method:** This The study utilized the Classroom Action Research (CAR) approach, conducted across three cycles that included the stages of planning, execution, observation, and reflection. Data collection was carried out through observational methods and performance-based assessments. The data were then analyzed using descriptive quantitative methods to evaluate the effectiveness of the learning implementation and the enhancement of students' psychomotor skills. **Results:** The findings indicated that the application of the PjBL model was rated as "Good," covering both student and teacher activities in collaboratively designing, conducting, and evaluating the project. Students' psychomotor learning outcomes significantly improved, with average scores increasing from 77.5 in Cycle I to 87.5 in Cycle III. The student passing rate also rose markedly, from 15.6% to 87.5%. **Novelty:** What sets this research apart is its contextual emphasis on knitting techniques in the fashion domain, highlighting psychomotor skills—an element that has frequently been neglected in earlier studies. Moreover, this study reinforces the relevance of the PjBL model in supporting the Merdeka Curriculum, which emphasizes the strengthening of technical skills, student independence, and creativity in vocational education.

INTRODUCTION

Indonesian education is continuously evolving to meet global dynamics, the challenges of Industry 4.0, and the rising complexities of labor market demands. The Merdeka Curriculum was introduced to address these challenges by granting teachers and students the autonomy to choose learning approaches that suit their needs, while focusing on strengthening 21st-century competencies, including critical thinking, innovation, teamwork, and effective communication (Darmawan & Winataputra, 2020). Within vocational schools, especially in the Fashion Design program, mastering hands-on skills like knitting is critically essential for student competence. However, learning activities in this context are still predominantly conventional and lack contextual relevance, which reduces learners' participation and prevents them from effectively mastering practical abilities.

To address this issue, Project-Based Learning (PjBL) offers a fitting solution, aligning well with the core values promoted in the Merdeka Curriculum. PjBL facilitates active and meaningful learning through authentic projects that encourage students to plan, collaborate, and reflect throughout the learning process (Afzal & Tumpa, 2025; Omelianenko & Artyukhova, 2024; Williamson, 2024). This approach has been proven to

enhance student motivation and learning outcomes, particularly in practical learning environments (Ayu & Suhartini, 2021; Sunismi & Werdiningsih, 2022).

Although PjBL has been widely studied, much of the available literature centers on students' intellectual development or creative thinking. Yet, fostering psychomotor abilities remains crucial in vocational education due to its close alignment with industry requirements. Thus, further investigation is needed to explore how well PjBL enhances learners' hands-on performance skills, particularly in the context of knitting techniques. Recent studies in 2025 further support the effectiveness of PjBL in enhancing student competencies. Marlina et al. (2025) found that PjBL-based worksheets improved 21st-century skills among elementary students. Kurniawati et al. (2025) reported enhanced understanding and practical skills in vocational students through PjBL modules. Avandri et al. (2025) recorded significant learning gains through integrating worksheets into PjBL. Agustina et al. (2025) confirmed PjBL's effectiveness in boosting learning outcomes in chemistry among high school students. Meanwhile, Hauko et al. (2025) demonstrated increased creativity through PjBL in geography education.

Based on the context, this research seeks to investigate the extent to which the PjBL model contributes to enhancing the psychomotor skills of Grade XI Fashion Design students, specifically in the knitting techniques course at VHS 8 Surabaya. This study examines the application of the PjBL approach and its effectiveness in fostering improvement in psychomotor performance.

RESEARCH METHOD

This study utilized a Classroom Action Research (CAR) approach, conducted collaboratively by the researcher, the supervising teacher, and a peer observer. The CAR method was chosen because the research aimed to enhance both the learning process and outcomes in project-based practical lessons by applying the PjBL model to the knitting techniques subject. The research was carried out in three cycles (see Figure 1), with each cycle including the stages of planning, implementation, observation, and reflection. These stages followed the CAR model developed by Arikunto et al. (2019), which emphasizes systematic evaluation and continuous improvement in each cycle.
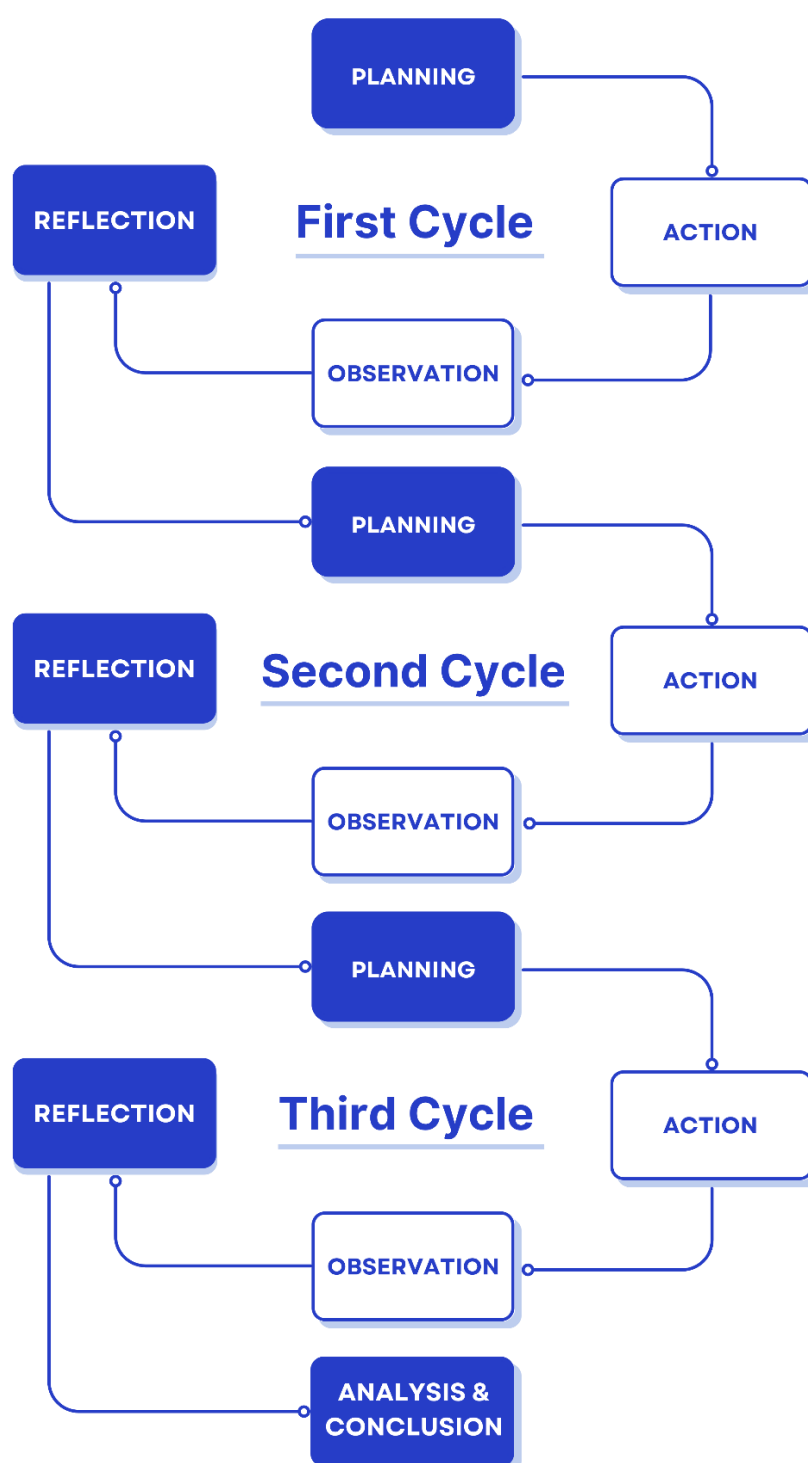
Figure 1. Research procedure.

The participants in this study were 29 students from Class XI Fashion Design 3 at VHS 8 Surabaya. The study was conducted during the even semester of the 2024/2025 academic year, specifically from February to March 2025. The selection of the research site and participants was based on the alignment of the practical material with the learning characteristics, as well as the importance of enhancing students' psychomotor skills in a vocational education setting.

The data gathered included both primary and secondary sources. Primary data were collected through observing classroom activities and assessing student performance, while secondary data came from school documents, teacher records, and students past

academic results. The main data sources were the students directly involved in the learning activities, while teachers and administrative documents served as supporting da

Data were collected using two main techniques: observation and performance tests. According to Kunandar (2015), observation is a continuous assessment technique conducted either directly or indirectly using the senses and based on an observation guide that includes behavioral indicators. This is supported by Sudjana (2015), who states that observation is a commonly used method to assess individual behavior or visible activities, whether in natural or artificial settings. In this study, observation was used to evaluate the implementation of the PjBL model from both teacher and studen. perspectives, using validated observation sheets.

To assess student learning outcomes, performance-based assessments were conducted through product creation tasks using knitting techniques. The evaluation criteria included accuracy of technique, neatness, design creativity, and punctuality in task completion. A four-point rubric was used for assessment, developed based on indicators from the psychomotor domain.

The data analysis technique employed was descriptive quantitative analysis. Observation data were analyzed by computing the average score for each indicator and categorizing the results into levels of implementation: very good, good, fair, or poor. Performance test data were analyzed by comparing the actual score to the maximum possible score and calculating the percentage of student mastery. This analysis aimed to identify improvement trends across the cycles, which then served as the foundation for reflection and enhancement in the following cycles.

RESULTS AND DISCUSSION
Results
The application of the PjBL approach in teaching product creation through knitting techniques to Grade XI Fashion Design students at VHS 8 Surabaya was carried out successfully and contributed positively to enhancing students' psychomotor performance.
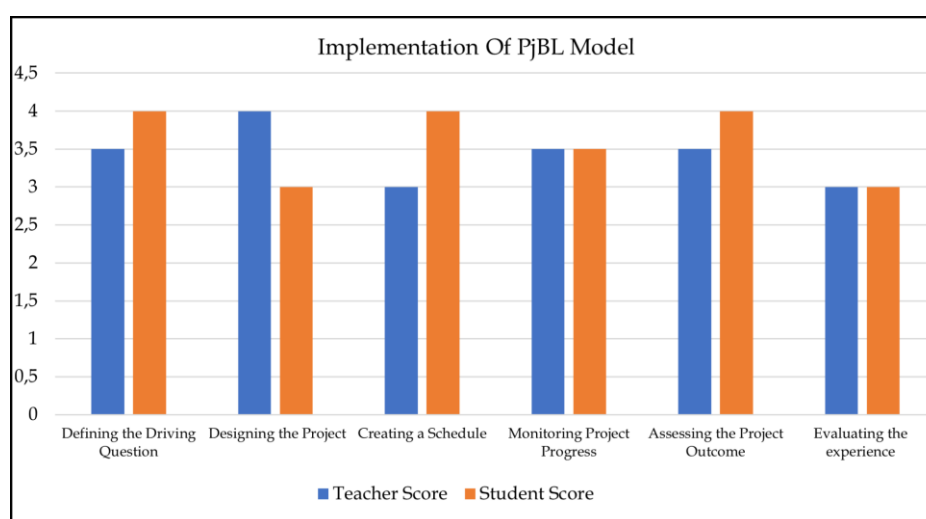
Implementation of the PjBL Model
Information regarding the learning implementation was gathered through observations of both teacher and student activities, guided by the six core stages of the PjBL model. These stages consist of formulating essential questions, planning the project, setting a timeline, overseeing project development, assessing the final product, and engaging in reflection. The observation process was carried out by the subject teacher along with peer observers.

The observation findings show that all stages of the PjBL model were carried out effectively. The overall mean score for its implementation was 3.50, categorized as 'Good'. During the stage of identifying essential questions, the average score reached 3.75, reflecting the teacher's success in directing students to identify relevant problems, accompanied by high levels of student enthusiasm. The stages of project planning, scheduling, and progress monitoring each attained an average of 3.50, indicating strong collaboration and communication between teacher and students. The stage of evaluating project outcomes also scored 3.75, with students confidently presenting their work. Nevertheless, the reflection stage received a lower average of 3.00, suggesting that the process of reflecting on learning still requires further development.

Table 1. Recapitulation of the implementation of the PjBL model.

PjBL Implementation Phase	Teacher Score	Student Score	Average	Category
Defining the Driving Question	3.50	4.00	3.75	Good
Designing the Project	4.00	3.00	3.50	Good
Creating a Schedule	3.00	4.00	3.50	Good
Monitoring Project Progress	3.50	3.50	3.50	Good
Assessing the Project Outcome	3.50	4.00	3.75	Good
Evaluating the Experience	3.00	3.00	3.00	Fairly Good
Overall Average	**3.42**	**3.67**	**3.50**	**Good**

Figure 2. Implementation of the PjBL model.

Students' Psychomotor Learning Outcomes

Students' learning achievements were measured using performance-based assessments that examined several criteria, including accuracy in linking techniques, tidiness, creative design, and timely completion. In the first cycle, the average psychomotor score was 77.50, with only 15.625% of students meeting the competency threshold. Following improvements in the second cycle—such as more intensive guidance and the inclusion of clearer product samples—the average score rose to 82.50, with 62.50% of students passing. By the third cycle, the average score had reached 87.50, with the pass rate increasing significantly to 87.5%.
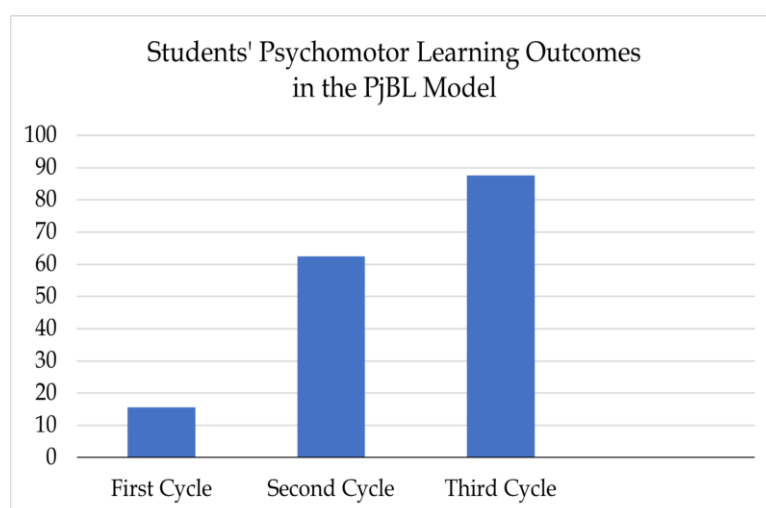
Figure 3. Students' psychomotor learning outcomes in the PjBL model.

The progressive improvement in student scores across the learning cycles demonstrates that the PjBL model plays a significant role in developing students' psychomotor abilities. This advancement is reflected in their improved execution of linkage technique projects, both in terms of technical precision and aesthetic quality. Through PjBL, students are given the opportunity to express creativity, engage in individual or group work, and conduct reflection on their learning process.

Discussion

The findings of this study suggest that the implementation of the PjBL model in teaching linkage techniques to Grade XI Fashion Design students at VHS 8 Surabaya was implemented successfully and contributed positively to enhancing students' psychomotor learning achievements. The average score for implementation reached 3.50, classified as 'Good', while students' psychomotor scores improved significantly, from 77.50 in Cycle I to 87.50 in Cycle III. These results suggest that PjBL is an effective instructional model for strengthening students' technical skills in hands-on learning environments. Consistent with this, Ayu and Suhartini (2021) also found that applying PjBL in vocational fashion education can boost learners' motivation and deepen both conceptual understanding and practical abilities.

These results are in line with the constructivist learning theory, which formed the theoretical foundation of this study. According to the constructivist view, learning occurs as an active process where students build their own understanding through meaningful involvement (Fitria et al., 2021; Suhendi et al., 2021; Wibowo et al., 2025). By applying the PjBL model, learners are not positioned as passive recipients of knowledge, but rather as active participants who design, carry out, and assess real-life projects connected to their daily experiences and future professions. This approach encourages deeper comprehension of concepts and supports the development of practical, job-relevant competencies. More precisely, the findings of this study reinforce Bloom's Taxonomy, especially in relation to the development of the psychomotor domain. Mastery of linkage techniques, which fall under textile-related competencies, demands fine motor coordination, accuracy, and creative thinking. The PjBL model has been shown to be effective in cultivating these abilities by providing students with opportunities to translate their theoretical understanding into real, assessable products (Indriati et al., 2024; Malin & Rind, 2022; Retno et al., 2025; Rohm et al., 2021).

This study reinforces previous research highlighting the effectiveness of PjBL in enhancing skills-based education. Ayu and Suhartini (2021) noted that PjBL increases student motivation and comprehension in vocational fashion subjects, particularly in relation to technical skill development. In a similar Vein et al. (2019) reported that the PjBL model enhances both creativity and academic performance among elementary students. Additionally, Sari and Hidayati (2018) highlighted that problem-solving tasks and the creation of authentic products within the PjBL framework foster active learner participation—an essential aspect in the teaching of vocational competencies.

These findings are also consistent with the study by Lestyoningsih and Hidayati (2020), which demonstrated that the implementation of the PjBL model in the Creative Products and Entrepreneurship course had a positive impact on students' critical thinking skills, yielding a score of 83.08%, categorized as 'very good'. Furthermore, Elisabet and Hardini (2019) reported that project-based learning increases student enthusiasm, thereby contributing positively to the overall learning experience. Yulianti and Yusmerita (2025) found that incorporating instructional video media for teaching basic pattern-making through the PjBL approach in fundamental fashion subjects yielded positive outcomes and proved beneficial for both students and educators throughout the learning process.

Nevertheless, the observation data revealed that the reflection stage within the PjBL framework obtained a relatively low average score of 3.00. This suggests that neither students nor teachers had yet fully optimized the process of reflecting on learning experiences. As emphasized by Sari and Hidayati (2018), project-based learning places importance not only on the final product but also on the active engagement of students throughout all phases, including reflection. This highlights a crucial point: the application of PjBL in vocational education should give equal attention to both the end product and the learning journey that accompanies it, particularly the reflective aspects.

The distinct contribution of this study lies in its specific emphasis on linkage technique skills, a topic that remains underexplored within the scope of classroom action research employing the PjBL model. Additionally, the research highlights the assessment of psychomotor learning outcomes, which are particularly pertinent to vocational education settings. Therefore, this study not only reinforces the general efficacy of PjBL but also offers empirical insights that support the advancement of hands-on vocational learning in line with the principles of the Merdeka Curriculum.

These results indicate that the application of PjBL is highly recommended in skill-based instruction, particularly in the field of Fashion Design, as it not only improves learning outcomes but also builds real work competencies needed in the creative industry. Furthermore, the sustained improvement in students' scores across the three cycles suggests that iterative implementation of PjBL enhances student performance over time (Assaf & Emirates, 2023; Chrustiana et al., 2025; He et al., 2023; Schneider et al., 2022; Zhang et al., 2024). This indicates that not only the method but also the process of continuous refinement and reflection plays a crucial role in achieving desired learning outcomes (Kong & Yang, 2024; Lazovsky et al., 2025; Smeplass, 2025; Syarif et al., 2024). Additionally, the significant increase in passing rates—from 15.625% to 87.50%—highlights how project-based tasks can reduce failure rates in vocational training when appropriately structured and scaffolded. These findings imply that incorporating real-world applications through PjBL helps bridge the gap between theoretical knowledge and technical execution, which is vital for vocational students.

CONCLUSION

Fundamental Finding: The findings of this study show that the application of the PjBL model in teaching linkage techniques within the Textile subject for Grade XI Fashion Design students at VHS 8 Surabaya was effectively carried out and contributed positively to enhancing students' psychomotor learning outcomes. This is supported by an average implementation categorized as Good and an increase in psychomotor scores from 77.50 to 87.50 over three learning cycles, PjBL has proven to be a learning strategy that fosters students' technical skills, independence, and creativity. These findings reinforce the main argument of this study: that PjBL aligns with the constructivist approach and is highly relevant for practice-based vocational education. **Implication:** The implications of these findings go beyond merely enhancing student learning outcomes; they also provide a concrete direction for implementing the Merdeka Curriculum in vocational education institutions. PjBL connects educational environments and industry expectations, especially in preparing students with practical competencies relevant to the fashion and textile sectors. Teachers must take on the role of active facilitators—not only providing technical guidance, but also fostering students' reflective awareness of both the learning process and outcomes. **Limitation:** Nevertheless, this study has certain limitations. Observations of the implementation revealed that the reflection phase was not yet optimally carried out. In-depth student reflection on the learning process was not systematically facilitated. Additionally, the scope of the study was limited to a single class and one subject matter, which means that generalizing the findings should be done with caution. **Future Research:** Future studies are encouraged to implement the PjBL model across a broader range of instructional content within Fashion Design, as well as in other vocational disciplines such as Product Design and Construction Technology. Subsequent studies could also broaden the scope by involving multiple schools or comparing the effectiveness of PjBL with other learning models. Additionally, it is important to develop more structured strategies for implementing the reflection phase so that PjBL not only impacts the final product but also strengthens the ongoing and meaningful learning process.

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