

Challenges in Implementing Project-Based Learning in Malaysian Vocational Colleges During Teaching Practicum

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Abstract

Project-Based Learning (PjBL) has become a pivotal pedagogical approach within Malaysian Technical and Vocational Education and Training (TVET), aiming to bridge the gap between theoretical knowledge and practical application. However, implementing PjBL presents significant challenges, particularly for practicum teachers in vocational colleges. This study investigates these challenges, focusing on two primary areas: classroom control and resource availability. A cross-sectional survey was conducted among 90 technical and vocational education undergraduate students who recently completed their teaching practicum. Results reveal moderate challenges in maintaining classroom control during PjBL activities, with a mean score of 2.42 on a 4-point Likert scale, while resource limitations, including insufficient materials and technology, were perceived as more severe (mean score: 2.88). A Spearman's correlation analysis ($r = 0.501$, $p < 0.01$) indicates a significant relationship between classroom control and resource adequacy, suggesting that resource shortages exacerbate difficulties in managing PjBL classrooms. The findings emphasize the need for improved resource allocation and enhanced teacher training to address these interconnected challenges. By addressing these barriers, the effectiveness of PjBL can be significantly enhanced, contributing to better student outcomes and workforce readiness in Malaysian TVET programs.

Keywords: Project-Based Learning (PjBL), Technical and Vocational Education and Training (TVET), Vocational College, Teaching Practicum

Introduction

Global economic shifts have led to an increased demand for a skilled workforce, positioning Technical and Vocational Education and Training (TVET) as a critical element within national education systems. In Malaysia, the government has identified TVET as a key driver of economic growth, particularly in sectors requiring specialized technical skills. In response, the Malaysian Ministry of Education has prioritized reforming TVET to better align with industry needs, thereby enhancing graduates' employability. One pedagogical approach that has gained significant attention is Project-Based Learning (PjBL), which integrates theoretical

knowledge with practical application, allowing students to engage in real-world projects that closely mirror industry tasks (Ali et al., 2019).

PjBL is not only about acquiring knowledge but also about applying it in complex and real-world situations. This approach deepens students' understanding of subject matter, enhances critical thinking and improves problem-solving skills. Students engaged in PjBL participate in collaborative work environments that simulate industry teamwork. This method has proven particularly effective in TVET settings, where the primary goal is to equip students with practical skills for immediate workforce entry (Rahman and Abdullah, 2021). Despite these benefits, implementing PjBL in Malaysian vocational colleges is fraught with challenges. Resource constraints, such as limited access to materials and technology, significantly hinder the effective adoption of PjBL. Moreover, many instructors lack sufficient training to facilitate PjBL, as traditional teaching methods remain predominant in these institutions. This situation underscores the need for comprehensive training programs that equip educators with the skills necessary to implement PjBL successfully (Wahab et al., 2018).

There is also a noticeable gap in the literature concerning the specific challenges and outcomes of PjBL in the context of Malaysian vocational colleges. While global studies on PjBL are abundant, research focusing on its implementation within Malaysia's unique socio-economic and educational environment remains limited. This study aims to address this gap by providing a detailed analysis of PjBL's effectiveness in Malaysian vocational colleges, exploring the challenges faced by educators and students and proposing actionable solutions (Ibrahim and Hassan, 2020).

Objective

The primary objective of this research is to identify the main challenges faced by practicum teachers in implementing Project-Based Learning (PjBL) and to propose strategies that can support them in overcoming these challenges. Specifically, the study aims to: (a) identify the level of challenges related to classroom control encountered by practicum teachers during PjBL implementation; (b) determine the level of challenges associated with the lack of resources that practicum teachers face in implementing PjBL; and (c) examine the relationship between classroom control and resource limitations within the context of PjBL implementation among practicum teachers at vocational colleges. By addressing these objectives, the study seeks to provide insights that can inform the development of effective strategies to enhance PjBL implementation in vocational education settings.

PjBL in TVET Education

Project-Based Learning (PjBL) is an innovative instructional approach that emphasizes active learning through the completion of complex, real-world projects. In the context of TVET, PjBL is particularly effective because it bridges the gap between theoretical knowledge and practical skills, preparing students for the technical demands of the workforce. This pedagogical strategy encourages students to take ownership of their learning, work collaboratively and apply their knowledge in meaningful ways. Recent studies have highlighted the effectiveness of PjBL in enhancing student engagement, motivation and achievement in TVET settings (Rahman and Abdullah, 2021).

Grounded in constructivist learning theories, PjBL argues that learners construct knowledge best through hands-on, experiential activities. This approach is especially relevant in TVET, where the focus is on equipping students with practical skills directly applicable in the workplace. Through PjBL, students engage in tasks that mirror real-world challenges, requiring them to use critical thinking, problem-solving and teamwork to develop solutions. These experiences enhance students' technical and soft skills, such as communication and leadership, which are increasingly valued by employers (Ali et al., 2019). In Malaysia, PjBL has been recognized as a key strategy for improving the quality of TVET programs. However, its implementation varies significantly across institutions, with some colleges fully integrating the methodology into their curricula while others continue to rely on traditional lecture-based teaching methods. This inconsistency reflects broader challenges in the Malaysian education system, including disparities in resources, instructor training and institutional support (Ibrahim and Hassan, 2020).

Recent research has also explored the impact of PjBL on student outcomes in TVET. Studies have shown that students in PjBL environments are more likely to demonstrate higher levels of engagement, motivation and achievement compared to their peers in traditional settings. For example, Lee et al. (2021) found that students who participated in PjBL projects reported a greater sense of preparedness for the workforce and were more confident in their ability to apply their skills in real-world situations. These findings suggest that PjBL can play a critical role in enhancing the effectiveness of TVET programs and improving student outcomes (Lee et al., 2021).

PjBL Implementation in Vocational Colleges in Malaysia

The implementation of PjBL in Malaysian vocational colleges has seen varying degrees of success, reflecting the diverse challenges and opportunities within the country's educational landscape. While some institutions have fully embraced PjBL as a core component of their curriculum, others have struggled with its adoption due to a range of factors, including limited resources, insufficient instructor training and resistance to change from traditional teaching methods. Understanding these challenges is critical for developing strategies to improve PjBL implementation across the board (Wahab et al., 2018).

One key challenge in implementing PjBL is the lack of adequate resources, both in materials and technology. Many vocational colleges in Malaysia operate with limited budgets, constraining their ability to provide the necessary tools and equipment for PjBL projects. This issue is particularly pronounced in rural areas, where access to modern technology and industry-standard equipment is often limited. As a result, students in these colleges may not have the same opportunities to engage in high-quality PjBL experiences as their peers in better resourced institutions (Ibrahim and Hassan, 2020). Instructor preparedness is another significant challenge. PjBL requires a shift in teaching practices, moving away from traditional lecture-based methods to a more facilitative role where instructors guide students through the project process. However, many instructors in Malaysian vocational colleges are not adequately trained in PjBL methodologies. This lack of training can lead to difficulties in effectively implementing PjBL, as instructors may struggle to manage the complexities of Project Based Learning and provide the necessary support to students (Tan et al., 2019).

Despite these challenges, there are success stories that highlight the potential of PjBL when implemented effectively. For example, some vocational colleges have successfully integrated PjBL into their curricula by forming partnerships with local industries. These partnerships provide students with access to real-world projects and industry expertise, enhancing the relevance and quality of their learning experiences. In these cases, PjBL has been shown to significantly improve student outcomes, including higher levels of engagement, motivation and skill acquisition (Lee et al., 2021).

In conclusion, while the implementation of PjBL in Malaysian vocational colleges is still a work in progress, there are clear signs of its potential to transform TVET education in the country. Addressing the challenges of resource constraints, instructor training and institutional support will be key to ensuring that all students can benefit from the advantages of PjBL. As more colleges adopt PjBL and share their experiences, best practices will emerge, providing a roadmap for others to follow in enhancing the quality of vocational education in Malaysia (Rahman and Abdullah, 2021).

Methods and Instruments

This study utilized a quantitative research approach to explore the challenges faced by practicum teachers in implementing Project-Based Learning (PjBL) within Technical and Vocational Education and Training (TVET) at Malaysian vocational colleges. A cross-sectional survey design was adopted, allowing for the collection of data from a large sample of participants at a single point in time. The survey, administered online via Google Forms, targeted technical education students from the Department of Technical and Engineering Education (JPTK) at Universiti Teknologi Malaysia (UTM), who had recently completed their teaching practicum. This timing provided real-time insights into their experiences with PjBL implementation.

The study focused on two main constructs: the challenges related to classroom control and the lack of resources necessary for effective PjBL implementation. A structured questionnaire, developed by the researcher, served as the primary instrument for data collection. This questionnaire structured the closed-ended questions with 4-likert scale to capture quantitative data for statistical analysis. The instrument underwent a validation process through a pilot study, ensuring its reliability and accuracy in measuring the targeted constructs.

To ensure the validity and reliability of the questionnaire, a panel of TVET education experts reviewed the instrument, assessing the relevance and clarity of the items. Content validity was confirmed through this expert review, while reliability was measured using Cronbach's Alpha, which yielded a score of 0.85. This high reliability coefficient indicated that the questionnaire items were consistent and effectively measured the constructs of classroom control and lack of resources aspects.

Data collection was conducted among 90 technical and vocational education undergraduate students who recently completed their teaching practicum with the online survey method facilitating efficient data gathering from respondents across various vocational colleges in Malaysia. The collected data were analyzed using descriptive statistics to summarize the participants' experiences and perceptions. Additionally, Spearman's correlation analysis was

employed to explore the relationship between classroom control and lack of resources, providing insights into how these factors impact the quality of PjBL implementation.

The findings from this study align with recent research that emphasizes the importance of adequate resources and instructor preparedness in the successful implementation of PjBL in vocational education settings (Chowdary and Rahman, 2021; Noor and Yunus, 2019). This methodological approach, supported by rigorous data collection and analysis, effectively captures the key challenges faced by practicum teachers in TVET, offering valuable insights for improving the implementation of PjBL.

Results and Discussion

The study conducted to assess the challenges faced by practicum teachers in implementing Project-Based Learning (PjBL) in TVET at vocational colleges in Malaysia has yielded insightful results. The study focused on two primary constructs: classroom control and the lack of resources, both of which are critical to the successful implementation of PjBL. The results suggest that while PjBL holds significant potential for enhancing vocational education, several challenges must be addressed to fully realize its benefits.

The quantitative analysis revealed several key insights into the challenges of implementing PjBL. Figure 1 illustrates the normal distribution of challenges related to classroom control, further reinforcing the moderate difficulty level faced by these teachers. This figure shows that the level of difficulty faced by practicum teachers in classroom control during PjBL activities was moderate, with a mean score of 2.42 on a 4-point Likert scale. This suggests that while teachers are somewhat able to manage classrooms effectively during PjBL, issues such as maintaining student engagement and managing group dynamics remain significant challenges.

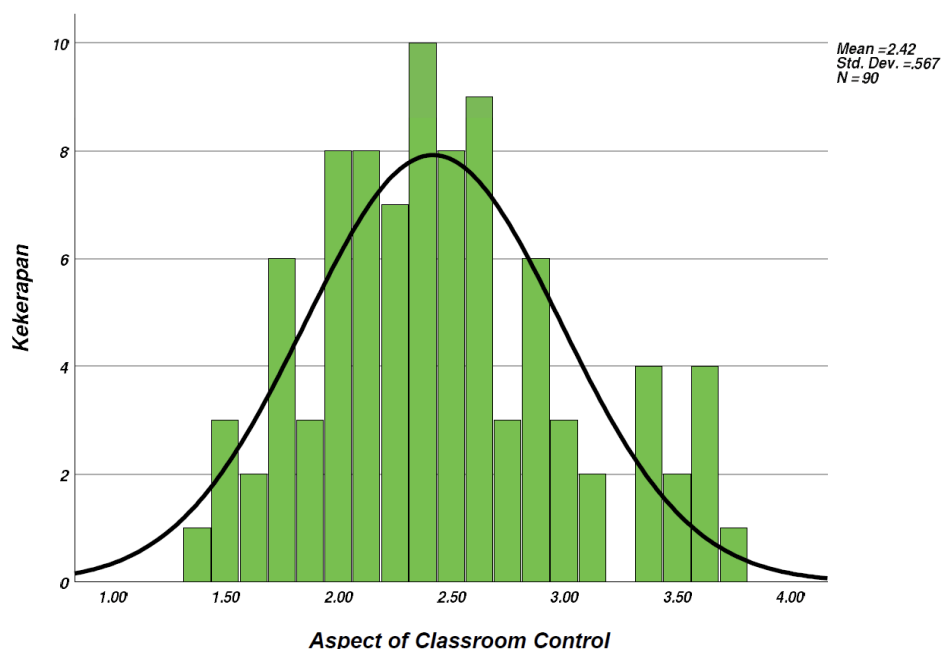


Figure 1: Normal Distribution Graph of the Challenge Level of PjBL Approach Implementation in Aspects of Class Control

The study also examined the availability of resources, which is crucial for the effective execution of PjBL. Figure 2 supports these findings by showing the normal distribution of challenges related to resource adequacy, further emphasizing the consistent difficulties across the surveyed population. This figure shows that the lack of resources was perceived as a significant barrier, with a mean score of 2.88. This indicates that resource constraints, such as insufficient materials, inadequate access to technology and lack of proper infrastructure, are substantial impediments to the successful implementation of PjBL in vocational colleges. To understand the relationship between classroom control and resource availability, a Spearman's Rho correlation test was conducted. Table 1 shows a significant positive correlation ($r = 0.501$, $p < 0.01$) between these two constructs, indicating that challenges in classroom control are often exacerbated by resource limitations. This finding suggests that improving resource availability could alleviate some of the classroom control challenges faced by practicum teachers during PjBL activities. The correlation also highlights the interconnectedness of these challenges, underscoring the need for a holistic approach to addressing them.

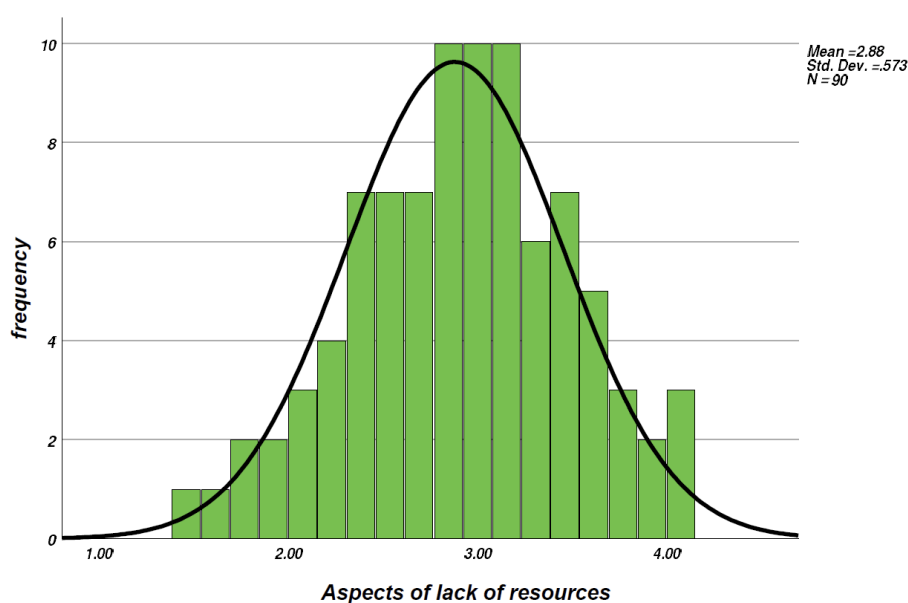


Figure 2: Normal Distribution Graph of the Challenge Level of PjBL Approach Implementation in Aspects of Lack of Resources

Table 1

Spearman's Rho Correlation Test Results

Spearman's Rho	Classroom Control	Correlation Coefficient	1.00	0.501
		Sig. (2-tailed)		<0.01
		N	90	90
	Lack of Resources	Correlation Coefficient	0.501	1.00
		Sig. (2-tailed)		
		N	90	90

The findings from this study align with recent literature that underscores the importance of resources and classroom control in the successful implementation of PjBL. For instance, Chowdary and Rahman (2021) emphasize that adequate resources and effective classroom control are critical for engaging students in meaningful project-based activities. The moderate level of difficulty in classroom control observed in this study suggests that while practicum

teachers are making efforts to engage students, they may lack the necessary support and training to do so effectively. Similarly, the significant challenges related to resource availability highlight the need for greater investment in educational infrastructure and materials, particularly in vocational settings where hands-on learning is essential. The positive correlation between classroom control and resource adequacy found in this study suggests that addressing resource constraints could improve overall classroom control during PjBL. This finding is consistent with the research by Noor and Yunus (2019), who argue that well-resourced learning environments are more conducive to active learning strategies such as PjBL. The interconnected nature of these challenges implies that efforts to enhance PjBL implementation must consider both the provision of adequate resources and the development of effective classroom control strategies.

In conclusion, this study highlights the significant challenges faced by practicum teachers in implementing PjBL within Malaysian vocational colleges. The moderate difficulty in classroom control and the substantial challenges related to resource availability suggest that while PjBL is a promising pedagogical approach, its success is contingent upon addressing these barriers. The positive correlation between these two factors further emphasizes the need for a comprehensive strategy that includes improving resource availability and providing targeted training for teachers. These findings contribute to the broader discourse on PjBL and offer practical insights for enhancing its implementation in vocational education settings.

Conclusion and Implications for Research

The study's findings indicate that practicum teachers in Malaysian vocational colleges face moderate challenges in implementing Project-Based Learning (PjBL), particularly regarding classroom control and resource availability. These challenges are interrelated, with resource adequacy significantly impacting the effectiveness of classroom control during PjBL sessions. The moderate difficulty in managing classrooms and the substantial obstacles posed by limited resources suggest that while PjBL is a promising pedagogical approach, its success depends heavily on addressing these issues. This conclusion aligns with recent studies that emphasize the importance of resources and effective classroom control in the successful implementation of PjBL (Guo et al., 2020; Hassan and Minggo, 2022). For PjBL to be effectively implemented, educational institutions must ensure that adequate resources are available and that teachers receive targeted professional development focused on both PjBL techniques and classroom control strategies in resource constrained settings. By doing so, institutions can help mitigate the challenges identified in this study and enhance the overall quality of vocational education.

Furthermore, this study underscores the need for future research to explore the long-term outcomes of PjBL in vocational education, particularly how sustained improvements in resource availability and instructor training impact student engagement, skill acquisition and employability. Investigating the scalability of PjBL across different vocational disciplines could provide valuable insights into adapting this approach to various educational contexts. In conclusion, the study contributes to the growing body of literature on PjBL by providing empirical evidence of the challenges and opportunities associated with its implementation in Malaysian vocational colleges. The findings offer practical recommendations for enhancing the effectiveness of PjBL, ultimately improving the quality of TVET education and better preparing students for the demands of the modern workforce.

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