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# The Influence of Project-Based Learning (PBL) on Students' Academic Performance in SPM Business Subject

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**Abstract**

Project-based l earning (PBL) is an instructional method that positively impacts the traditional teacher-centered learning culture. This study aims to examine the influence of PBL approach (active learning, self-learning, product-oriented, critical thinking) on students' academic performance in Business subjects. A quantitative approach was adopted, utilizing a survey design and a questionnaire as the primary research instrument. The sample comprised 329 students, selected through random sampling. Data analysis was conducted using descriptive statistics and multiple linear regression, with SPSS software version 29.0. The results indicate that PBL significantly contributes to improving students' academic performance in Business subjects. Multiple regression analysis revealed that critical thinking had a more substantial impact on student performance in Business subjects compared to active learning, product-oriented, and self-learning. The findings suggest that students should remain committed to actively engaging in the PBL method implemented by teachers. Teachers are encouraged to plan effective and engaging lessons that capture students' interest. Additionally, the Ministry of Education should support the successful implementation of PBL by providing necessary resources to teachers.

**Keywords:** Project-Based Learning (PBL), Students' Academic Performance, Business Subject

## Introduction

The era of globalization has brought about numerous changes to countries around the world, and it has had both positive and negative effects on the education system of each nation. Along with educational reforms aimed at developing 21st-century skills, many scholars have explored the concept of project-based learning (PBL). As a student-centred teaching approach, project-based learning (PBL) directly aims to foster 21st-century skills, particularly higher-order thinking skills (HOTS), through solving challenging problems that emphasise real-world situations and an open environment. This encourages students to continuously explore, thereby promoting the development of higher-order thinking (Lu Zhang & Yan Ma, 2023). Oby et. al., (2019) stating that this theory has transformed the classroom environment from passive to an activity-based teaching and learning approach. Rationally, PBL aims to

develop students' problem-solving abilities and critical thinking, encourage peer collaboration, and stimulate both affective and cognitive skills that contribute to intellectual and creative development among students.

Over the past few decades, project-based learning (PBL) has gained significant attention in the field of education. In Malaysia, PBL has also been embraced as an educational approach to achieve 21st-century skills such as critical thinking, active learning, self-directed learning, and creativity. Numerous past studies have examined the effectiveness of PBL on learning outcomes, with most indicating positive results in improving student performance. The government has also expressed a desire to integrate PBL into more schools in Malaysia by adopting it as a teaching and learning practice in classrooms. The Ministry of Education Malaysia (KPM), through the Standard Curriculum and Assessment Document (DSKP) for each subject, has recommended PBL as one of the methods that teachers can use during the teaching and learning process in the classroom. The implementation of PBL offers students the opportunity to actively engage in learning, interact with real-world scenarios, and provides them with the freedom to complete tasks, all within the scope and time limits set. Furthermore, the PBL approach helps to loosen the rigid and narrow learning system in schools that traditionally focuses solely on theory (BTP, 2006). Additionally, the DSKP for several elective vocational subjects (MPEI) within the technical and vocational fields requires students to undertake project assignments to complement the subjects taken for the Sijil Pelajaran Malaysia (SPM). Among the subjects involved are Accounting, Business Studies, Home Science, and Design and Technology. These project assignments account for between 20 to 30 percent of the final grade for these subjects and are considered in the SPM. This requirement demonstrates that PBL has been given serious emphasis for implementation within the KPM curriculum.

Various issues have been raised regarding the implementation of project-based learning (PBL) in schools, which has led to numerous past studies. One of the key concerns is related to the capabilities of the teachers. A lack of knowledge regarding the subject content that needs to be taught, as well as the absence of expertise in teaching those subjects, disrupts the teaching and learning process, thus having a negative impact on student achievement (Razemah & Norasmah, 2023). The lack of expertise can also be linked to the weaknesses of teachers in implementing PBL in Business Studies. Teachers need to adopt a creative approach in teaching Business Studies to benefit both students and the wider community (Chitra et al., 2022). Conventional teaching methods employed by some teachers only encourage negative attitudes towards learning, especially in Business Studies (Mohammad Zhafri, 2018). The situation worsens when there are still a few teachers who have not mastered the content of 21st-century skills (Bernard, Supiah & Maslinda, 2021). A study conducted by Razemah & Norasmah (2023) found that teachers' knowledge was at a high level, indicating that Business Studies teachers possess extensive knowledge of the field. However, the study also showed that there was no significant correlation between the teachers' knowledge and student performance (Razemah & Norasmah, 2023). This finding suggests that even though Business Studies teachers have a high level of knowledge about the content and pedagogy, issues regarding student performance have yet to be resolved. This result provides the impetus for further research to examine the effectiveness of the PBL approach in teaching Business Studies. Therefore, the aim of this study is to investigate the impact of PBL on dimensions

such as active learning, self-directed learning, product-oriented learning, and critical thinking, and how these influence students' academic performance in Business Studies.

**Literature Review**

The PBL approach has adapted several learning theories proposed by renowned thinkers. PBL supports the constructivist learning theory, which encourages students to acquire knowledge actively, effectively, and creatively, promotes interaction with peers and teachers, and provides a conducive learning environment. According to Ehqa & Denis (2024), constructivism is a theory that grants individuals the freedom to learn or seek their needs by exploring their desires with the help of others. This theory emphasises that people construct their own understanding and knowledge of the world through learning experiences and reflect on those experiences (Akpan et al., 2020). The concept of learning alongside peers is based on Vygotsky's theory, which asserts that cognitive control development is a social process and occurs progressively. A study by Mohd Fadzli Ali, Normah Salleh & Juhazren Junaidi (2007) found that group discussions and the collaborative skills applied while working in groups also enhanced communication skills. In Schunk's (1996) writing, it is explained that Vygotsky's theory does not support the behavioural theory, which suggests that learning is merely a passive response to the environment, but rather asserts that humans have the ability to change the learning environment to suit their needs.

*Project-Based Learning (PBL)*

Project-Based Learning (PBL) has been implemented as an effective approach to achieve student-centred learning in education, with a focus on various skills required for the 21st century. The national implementation of PBL requires significant changes at several institutional levels, such as support from leadership, infrastructure facilities, curriculum transformation, assessment adjustments, and, most importantly, the involvement of teachers who are key to its execution. Since then, PBL has been thoroughly explained and applied in teaching through subject content or curricula in schools and educational institutions. PBL, through various stages of implementation, begins with selection, planning, investigation, and the creation of a product that addresses real-world issues. Students are required to take responsibility for their own learning by using the knowledge gained to create and present various products in depth. Furthermore, PBL stimulates the enhancement of students' skills through a variety of activities, including the use of computers, group collaboration, and any movements that can stimulate fine and gross motor senses, helping them learn through hands-on experience (Azlina, 2017). In a comprehensive sense, it is explained that PBL is an organised teaching approach that involves the development of students' knowledge and skills. The PBL approach includes, among other things, active learning, product-based learning, self-directed learning, and critical thinking through a streamlined and systematic learning process based on challenging, authentic questions, product creation, and well-planned tasks. In conclusion, the objective of PBL is for students to learn from both the process and the outcome.

*Active Learning*

Active learning is a PBL approach where students actively engage in their own learning, as opposed to passively receiving information from the instructor (Prince, 2004). Essentially, active learning is an approach that focuses on activities carried out by the students themselves with guidance and direction from the teacher. This involves the process of

information reception by students, understanding the information conveyed through diagrams, charts, or brief notes, conducting science experiments with guidance, explaining the results of experiments, and collaboratively solving problems that arise during the experiment (Mohd Azman, 2005). It encompasses various activities that require students to think critically, discuss, solve problems, and apply the concepts they have learned. Several active learning methods, such as collaborative learning, brainstorming, group work, role-playing, cooperative learning, debates, think-pair-share, and presentations, are employed to ensure diverse teaching strategies (Samina & Fauzia, 2011). These varied methods offer many advantages, such as enhancing critical thinking skills, developing students' communication abilities, exposing students to conflict resolution situations, and providing indirect experience with real-world work environments. Active learning should occur in any situation, whether in small or large groups, or individually. It is at this stage that the educator's ability to select the best methods to ensure active learning is effectively implemented becomes crucial. It is clear that active learning is one of the methods within student-centred strategies that involves various forms of activities, both inside and outside the classroom. By applying active learning, educators have utilised a strategy that can manage the teaching and learning process of Business Studies at a high standard, while also providing students with meaningful and enjoyable learning experiences.

*Self-Learning*

The PBL approach in the learning process also provides students with the opportunity to engage in self-directed learning, where they prepare themselves for aspects of self-management, such as time management, resource management, stress management, and encourage students to strengthen their 21st-century skills. Self-directed learning is a highly beneficial learning method as it is believed to create opportunities for students to learn more efficiently, thereby developing their potential in terms of attitudes, effectiveness, and intellect (Ibrahim, 2021). For students' learning to be more meaningful, they need to explore their learning abilities to discover the best methods for engaging in the learning process (Nurul Ain & Shahabuddin, 2023). This enables students to freely choose the most suitable learning methods according to their own capabilities. Teachers, as educators, need to create spaces and opportunities for students to cultivate self-directed learning as a practice for meaningful learning. Such efforts can encourage students to take more responsibility in the learning process they undergo daily. Indirectly, the culture of self-directed learning can be adopted by group members in planning development activities in alignment, clarifying the processes to be followed, outlining systematic roles for members, and having a clear direction (Md. Baharuddin & Hairul, 2011).

*Product-Based Learning*

PBL is one of the teaching and learning strategies that successfully achieves the objectives of student-centred learning, focusing on the production of a product, as recommended by the Curriculum Development Division in 2014, considering it suitable and effective. What drives both teachers and students to explore during the PBL process is the emergence of learning challenges. According to Noor and Nasri (2021), there are four key stages that students need to go through when implementing PBL: designing, problem-solving, making decisions, and conducting investigations before producing a product or presenting their ideas. After completing the stages, discussions between the teacher and each team member should take place to evaluate the product and peer performance. These discussions help build a better

understanding of their own work and develop metacognitive skills (Noor and Nasri, 2021). To fulfil the requirements for the Business Studies SPM exam, students must complete a business project assignment, which involves creating a business plan. The business plan produced is accepted as a product resulting from their learning. Therefore, through creative and innovative project activities, a robust teaching approach emerges, one that is capable of producing students with forward-thinking mindsets (Angielyn & Siew, 2022).

*Critical Thinking*

Critical thinking skills are an essential element that must be emphasised in the educational curriculum (Anita Ismail et al., 2020). The term "critical" originates from the English word "critic." According to The Oxford English Dictionary (1989), the term derives from the Greek word *kritēs* (kritikos), which means "to judge" or "to assess." In the context of the Malay language, Kamus Dewan defines "critical" as not accepting or agreeing with something directly without careful consideration, by first evaluating its merits and drawbacks, and involving analysis or critique (Noresah Baharom, 2020). Critical thinking skills encompass several key aspects, including the ability to gather information, make decisions, form inferences, and build analogies (Zaharah Hussin, 2005). In the context of teaching and learning, the application of critical thinking and problem-solving skills plays an important role as an approach to produce a generation that is not only academically excellent but also possesses outstanding human capital qualities.

*Business Subject*

The development and economic growth of the country have been significantly contributed to by the field of entrepreneurship, which has created substantial employment opportunities for society (Roomi et al., 2021). As a result, the National Entrepreneurship Policy 2030 has been implemented in Malaysia to foster an entrepreneurial culture and ecosystem, enabling the country to achieve sustainable economic growth. Through the education sector, the responsibility of nurturing entrepreneurial skills among school students has been entrusted to the Ministry of Education Malaysia (KPM) (KPM, 2013). In line with this, at the secondary school level, the Elective Vocational Subject (MPEI) Business Studies was introduced to develop students with skills in communication, leadership, accounting, and effective management (BTP, 2016). Students are given the freedom to choose MPEI based on their individual interests. Knowledge and skills can be enhanced through the MPEI Business Studies for students interested in entrepreneurship who choose Business subject as an elective subject (BTP, 2016).

In line with the technological advancements in industry aimed at achieving the goal of becoming a developed nation, an initiative has been introduced to prepare holistic, balanced, ethical, critical, creative, innovative individuals who practice a professional culture to face the challenges of the 21st century. This initiative is the development of the Business Studies MPEI curriculum. One of the objectives of the KSSM Business Studies MPEI is to equip students with knowledge, skills, and values in business, preparing them to become smart consumers, competent workers and entrepreneurs, confident, positive, ethical, and responsible citizens for the well-being of themselves, their families, society, and the nation (Curriculum Development Division, 2016). To complete the learning of the Business Studies subject, all students who register for this subject in the Sijil Pelajaran Malaysia (SPM) examination are required to produce an individual project assignment by preparing a complete Business Plan

according to the specified criteria. This project, which involves creating a business plan, is included as a question in Paper 3 and accounts for 20 marks of the overall 100% score for the grading of this subject at the SPM level. Students who do not complete this project will be assessed as having failed to meet the requirements for this subject and will receive a grade of 'T' on their SPM examination result slip. The first cohort to study this subject was the Form 4 students of the 2017 school session, who sat for the Business paper in the 2018 SPM examination.

*Students' Academic Performance*

Teacher assessment of students is measured based on their academic performance achievements. In national examinations such as the Sijil Pelajaran Malaysia (SPM), the number of grades attained reflects the high or low performance of a student. Academic performance refers to the scores or grades achieved by students in tests or public examinations (Nora'Azian & Fadzilah, 2018). Teacher assessment typically takes the form of marks, percentages, grades, rankings, or student positions within the class (Muhamad Abdillah & Haleefa, 2011). A study by Wan Suhaidashima et. al., (2019) indicated that the performance in Business Studies was at a moderately high level. In this study, student performance refers to academic achievement in the Business Studies subject. Students' performance is evaluated based on the scores they obtained from their results in the mid-year examination of the current school session. The mid-year exam was chosen because the students had gone through various stages of PBL in applying the business knowledge they had learned since the beginning of the school year in March 2024.

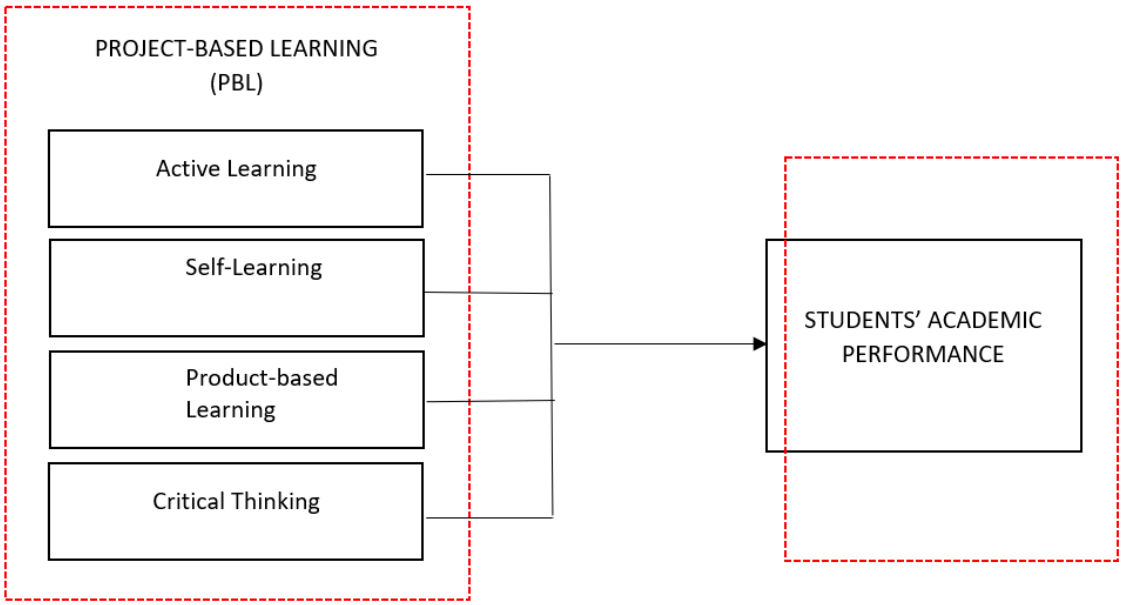



Figure 1: Conceptual Framework

Based on Figure 1, the conceptual framework illustrates the adapted and customised framework from the Socioeconomic Relationship Model, financial literacy, and psychological factors in relation to financial preparation for retirement (Rabeah & Sheerad, 2023).

## Methodology

*Research Design*

The research design to be conducted employs a quantitative approach using a survey design. A quantitative approach is chosen to examine the effects of influence between the

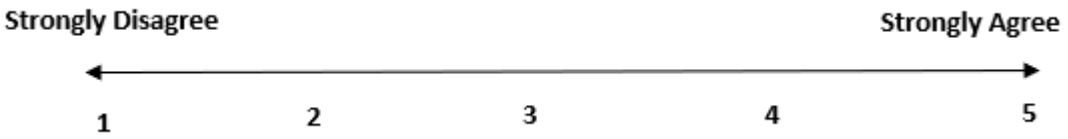
dependent variable (students' academic performance) and the independent variable (the level of active learning approach). The process involves two stages: a pilot study and the main study. The pilot study is conducted with 100 respondents to ensure the reliability of the items in the research instrument. To achieve the objectives, the main study is carried out with 329 respondents involved in the research. IBM SPSS software (version 29.0) is used for statistical analysis.

*Sample*

This study adopts a simple random sampling design to collect research data. The sample size was determined using the sample size determination table by Krejcie and Morgan (1970). The study required a minimum sample size of 322 respondents. The total population for this research consists of 1,986 secondary school students from national secondary schools (SMK) in the Wangsa Maju area of Kuala Lumpur. The study focuses exclusively on Form 4 and Form 5 students who have chosen Business as their elective subject (MPEI).

*Research Instrument*

For data collection purposes, a questionnaire was designed to align with the study's objectives. The questionnaire includes 26 items related to the active learning approach (PBP), divided into four dimensions. Additionally, there is a single item addressing students' academic performance in the Business subject. To obtain respondents' background information, six items were included regarding their demographics. The questionnaire was distributed to respondents online using Google Forms. A five-point Likert scale was employed as a measurement tool to identify the level of active learning approach practices. Responses to each item on the instrument used a Likert scale graded from highly positive to highly negative. The order of agreement or disagreement can be reversed, ranging from strongly disagree to strongly agree. This questionnaire applies a Likert Scale where [1] = Strongly Disagree and [5] = Strongly Agree.




*Data Analysis Method*

Data analysis was performed using IBM SPSS software (version 29.0). The data was then analysed using descriptive analysis and inferential statistic as multiple regression. The reliability of the questionnaire items was tested by obtaining Cronbach's Alpha values through a pilot study. Validity testing was not conducted as the items were adapted from previous studies. As shown in Table 1, all tested items met the criteria for use. The Cronbach's Alpha value exceeded 0.7, consistent with Chua (2021), who stated that a research instrument with a Cronbach's Alpha value of $\alpha > 0.70$ is acceptable. If the value falls below this threshold, the items should be revised or removed.

Table 1
*Alpha Cronbach's Test*

| Variables | Total Item | Alpha Cronbach's value |
|---|---|---|
| **Project-based Learning** | | |
| Active Learning | 6 | 0.846 |
| Self-learning | 7 | 0.883 |
| Product-oriented Learning | 6 | 0.889 |
| Critical Thinking | 7 | 0.886 |

**Descriptive Analysis Results**

Table 2
*Demographic Profiles*

| Demographic | Frequencies | Percentage (%) |
|---|---|---|
| **Gender** | | |
| Boy | 109 | 33.1 |
| Girl | 220 | 66.9 |
| **Ages** | | |
| 16 years old | 127 | 38.6 |
| 17 years old | 202 | 61.4 |
| **Race** | | |
| Malay | 306 | 93 |
| Chinese | 3 | 0.9 |
| Indian | 12 | 3.6 |
| Bumiputera (Sabah/Sarawak) | 3 | 0.9 |
| Others | 5 | 1.5 |
| **Religion** | | |
| Islam | 317 | 96.4 |
| Hindu | 9 | 2.7 |
| Budha | 3 | 0.9 |
| Kristian | - | - |
| Others | - | - |
| **Social Media** | | |
| Yes | 329 | 100 |
| No | - | - |
| **Purpose of Social Media** | | |
| Learning | 76 | 23.1 |
| Entertainment | 56 | 17 |
| Hobbies | 158 | 48 |
| Others | 39 | 11.9 |

Table 2 above summarizes the findings on the respondents' profiles, including gender, age, ethnicity, religion, social media ownership, and purposes of social media use. The findings indicate that female students dominated the study, representing 66.9% of the respondents, totalling 220 individuals. The majority of respondents were 17 years old, accounting for 61.4% of the total 329 participants. Malay respondents constituted the highest proportion, with 93% of the total responses. Only a small number of respondents were of Chinese, Indian, and Bumiputera (Sabah and Sarawak) descent, totalling 18 individuals. The majority of respondents identified as Muslim, making up 96.4% of the participants. All respondents reported owning social media accounts, with the most common purpose being leisure, accounting for 48%. A smaller proportion, 23% (76 respondents), used social media for

educational purposes. The remainder utilised social media for entertainment and other purpose.

*Inferential Analysis Results*

This section presents the results of the inferential statistical analysis aimed at exploring the impact of the project-based learning approach, encompassing active learning, self-learning, product-oriented learning, and critical thinking, on students' academic performance in the MPEI Business subject. The hypothesis are presented as below:

**H1**: Active learning has a significant effect on students' academic performance.

**H2**: Self-learning has a significant effect on students' academic performance

**H3**: Product-oriented learning has a significant effect on students' academic performance

**H4**: Critical thinking has a significant effect on students' academic performance

The assumptions of normality and linearity have been met for conducting multiple regression analysis. **Figure 2** illustrates that the data is normally and linearly distributed, with the plotted points closely aligned with the 45-degree straight line.

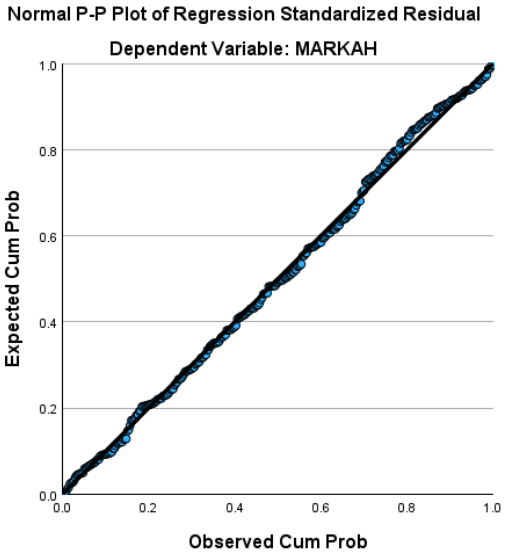



Figure 2: Normal P-P plot

**Table 3** reports that the active learning approach has a significant positive linear relationship with academic performance. Critical thinking (β=6.599) emerged as the most dominant dimension influencing students' academic performance, with a t-value of 2.902 and p=0.004 (p<0.05). For the active learning dimension (β=4.796), the t-value of 1.927 and p=0.055 (p>0.05) indicate that the relationship between active learning and students' academic performance is not statistically significant at p<0.05. This suggests that while active learning has a positive effect on academic performance, the effect is not strong enough to be considered statistically significant.

The self-directed learning dimension (β=-1.351) recorded a t-value of -0.493 with p=0.623 (p>0.05), indicating that the relationship between self-directed learning and academic performance is not statistically significant at p<0.05. Although there is a negative relationship between self-directed learning and academic performance, the effect is not strong enough to be considered significant. The p-value of 0.623 suggests this effect might be due to chance or other factors not accounted for in the regression model.

For the product-oriented learning dimension, the t-value of -0.101 with p=0.919 indicates that the relationship between product-oriented learning and students' academic performance is not statistically significant at p<0.05. The p-value of 0.919, being far greater than 0.05, suggests that the observed negative effect (β=-0.293) is neither strong nor consistent enough to be deemed statistically significant. The multiple regression equation for this analysis is as follows:

**Students' academic performance = 7.724 + 4.796 (Active learning) -1.351 (Self-learning) -0.293 (Product-oriented) + 6.599 (Critical thinking)**

Table 3
*Coefficients*

| **Variables** | ***Unstandardized Coefficients*** | | ***Standardized Coefficients Beta*** | **t** | **Sig.** |
|---|---|---|---|---|---|
| | ***Beta*** | ***Std. Error*** | | | |
| *Academic Performance (constant)* | 7.724 | 7.818 | | 0.988 | 0.324 |
| *Active learning* | 4.796 | 2.489 | 0.156 | 1.927 | 0.055 |
| *Self-learning* | -1.351 | 2.742 | -0.043 | -0.493 | 0.623 |
| *Product-oriented* | -0.293 | 2.899 | -.0.009 | -0.101 | 0.919 |
| *Critical thinking* | 6.599 | 2.274 | 0.225 | 2.902 | 0.004 |

**Discussion**

The overall influence of the active learning approach and its dimensions is discussed. The findings indicate that the PBL approach, encompassing four dimensions, has a weak positive correlation with students' academic performance. Among these, only the critical thinking dimension demonstrates a significant relationship. Critical thinking aids students in developing a deeper understanding beyond rote memorisation, preparing them better for exams and tests. It enhances decision-making abilities, ultimately boosting their academic performance. Students who think critically tend to have greater self-confidence as their decisions are based on analysis and comprehensive understanding. This confidence motivates them to work harder, challenge themselves, and find ways to improve academically.

Three dimensions—active learning, self-directed learning, and product-oriented learning—show no significant relationship. Although active learning shows a positive impact, it is not statistically significant. This could be attributed to factors such as a small sample size, ineffective implementation, or the influence of more dominant factors on academic performance. The self-directed learning dimension also shows no significant relationship, possibly because self-directed learning within the PBL framework is not sufficiently effective in improving academic performance in this study's context. Other factors, such as teacher support or an unconducive environment, could impact its effectiveness.

For the product-oriented learning dimension, the analysis indicates no significant relationship with academic performance (p=0.919). The findings suggest that product-oriented learning has a negative effect on academic performance, but this effect is not strong enough to be statistically significant. This may result from the way product-based tasks or projects are conducted, which might not directly contribute to academic achievement, or other elements in teaching might play a more significant role.

**Conclusion**

This study provides valuable insights into the role of Project-Based Learning (PBL) in shaping students' academic performance in Business subjects. While the findings suggest that critical thinking, a key dimension of PBL, significantly influences academic achievement, the other dimensions—active learning, self-learning, and product-oriented learning—did not demonstrate statistically significant effects. These results highlight the need for further refinement in the implementation of PBL to maximize its benefits. Factors such as teacher support, project planning, and student motivation play a crucial role in determining the effectiveness of this approach. Therefore, for PBL to be a successful instructional strategy, it requires well-structured planning, comprehensive support from educators, and a conducive learning environment. Given that educational reforms often emphasize the integration of innovative teaching methods, this study reinforces the necessity for policymakers, educators, and institutions to collaboratively work towards enhancing the implementation of PBL. Specifically, business education should leverage this approach to equip students with essential entrepreneurial skills, balancing cognitive, psychomotor, and affective competencies to prepare them for future careers.

This study contributes to both theoretical and practical discussions on PBL by extending existing knowledge on its impact on academic performance within the context of business education. Theoretically, it aligns with constructivist learning principles, supporting the idea that student-centered, inquiry-driven learning fosters deeper cognitive engagement. The findings reinforce the argument that critical thinking is a fundamental component of effective learning, validating the role of active, student-driven exploration in academic success. Contextually, this research holds significance for the Malaysian education system, where the integration of PBL into business education aligns with national efforts to promote entrepreneurship and 21st-century skills. By shedding light on the varying effects of PBL dimensions, this study provides a framework for refining instructional strategies, ensuring that PBL is implemented in a way that maximizes student learning outcomes. Additionally, the findings serve as a call for increased institutional support, emphasizing the need for collaboration among educators, school administrators, and policymakers to create an environment where PBL can thrive and effectively contribute to student success.

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