



# Phenomenological Case Study of Project-Based Learning on Graduand STEM Students' Performance

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## Abstract

Project-based learning has been widely embraced as a pedagogical strategy in nations recognized for their excellent educational systems, such as United States, United Kingdom, Germany, Canada, and France. Educational establishments in the Philippines are already starting to include PBL into their curricula in response to this global trend. The goal of this study is to better understand how STEM students in grade 12 at Gumaca National High School are using project-based learning. The study used phenomenology and case study as the methods to know the important insights into the students' experiences with project-based learning, its success, and the key elements influencing it. Individual interviews and focus groups were the main study methodologies used by the researchers. Convincing findings are supported by these exacting methodologies: PBL's efficacy is compromised by improper execution and the lack of adaptation. The hands-on experiences, positive engagement, career exploration and realization helped certain students in academics by enhancing and preparing them for their future careers. The results strongly imply that project-based learning must receive attention and support from the government as well as from educational institutions. Also, support from parents regarding the mental health of every student. Hence, the study categorically shows the urgent necessity for extensive improvements in designs of the curriculum, knowledgeable teachers, mentorship and counselling, research possibilities, college readiness, academic support services, ongoing evaluation and feedback, personal environment, and multidisciplinary approach are in need to attain a high educational level that will generate a profound impact and offer priceless support to every student.

**Keywords:** *project-based learning, experiences, adaptability, and implementation*

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## About the author:

The author has excelled as a winner in research fairs held by both in school and division levels, showcasing creative thinking and dedication to knowledge advancement. Also, he excelled at the Philippine National Festival of Talents, extending his list of accomplishments to the national level. Another important aspect of the author's journey is leadership. He was a proud valedictorian, which was the cherry on top of his accomplishments. Email: [alfonzeviktor@gmail.com](mailto:alfonzeviktor@gmail.com)



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## **Introduction**

Project-Based Learning (PBL) is an innovative approach to teaching STEM education that fosters active and inquiry-based learning specifically in Grade 12 students. It allows students to work collaboratively on real-world problems, develop critical thinking skills, and apply knowledge to complex issues. According to World Population Review (2021), the United States, United Kingdom, Germany, Canada, and France are the top five best performing educational systems in the world that provide quality learning, and it is also known that these countries use PBL as a medium for academics. Anyhow, its impact on students' graduation performance remains to be investigated. Fortunately, viewed from a research point of view, it has a relation to the behavior portrayed by students who undergo this approach.

In the Philippines, PBL is gaining recognition as an effective approach that promotes students' critical thinking, creativity, and problem-solving skills, and the Department of Education has been advocating its use in K-12 education. Having this practiced in the locale is a worth-investing approach. But since the study deals with different insights and personal beliefs of students, some may choose to stick to traditional academic practices as it gave them the foundation to the present. To sum up, Gayeta and Resaba (2021) concluded significant understandings on how PBL resources are used and how well they work in Senior High schools in the Division of Lipa, Batangas, and Batangas City. This study helps decision-makers in the educational field make well-informed choices that will improve methods of student-centered learning, teaching, and assessment.

This study aims to investigate the impact of PBL on Gumaca National High School's Grade 12 STEM students' graduation performance in the academic year 2022-2023 using a phenomenological case study approach. The study's findings may inform educators and policymakers about the potential benefits of PBL in STEM education, leading to improved teaching strategies and students' academic outcomes.

## **Methodology**

The study used a dual research design that combined phenomenology and case study methods to thoroughly examine students' academic performance and lived experiences in the

context of PBL. The goal of this mix of methodologies was to increase the study's veracity and thoroughness. The study, which concentrated on Grade 12 STEM curriculum students, was carried out in the STEM Building at Gumaca National High School. Six participants were chosen through the use of purposive sampling; they came from various sections and each had a different perspective on PBL.

Semi-structured guide questions were included in the research instruments to gauge participants' attitudes toward PBL and how it affected their academic performance. The themes were categorized using these open-ended questions, which allowed for effective analysis. Focus groups and case study interviews were used in the data collection process.

The necessary approvals were obtained from the appropriate authorities, and participants' informed consent was obtained. Utilizing the MAXQDA tool for qualitative data analysis, the data analysis included ongoing comparison analysis. To ensure a thorough understanding of the data, conventional analysis methods like theme analysis and human coding were also used.

The study's participants and teachers provided consent and were made aware of the goal and methods of the study as a matter of ethics. Participants' rights were upheld in accordance with the rules, with a focus on informed choice, data privacy, and protection.

The research aimed to achieve saturation in data collection and improve the credibility of findings by fusing phenomenology and case study methodologies. A thorough investigation into the relationship between project-based learning, students' experiences, and academic performance was made possible by the location chosen, the STEM students, and the use of various data collection and analysis techniques. The research's dedication to participant welfare and information security was underlined by ethical considerations and adherence to data privacy regulations.

## **Findings**

The findings examined studies is that project-based education is an efficient teaching strategy that, when used judiciously, surpasses conventional teaching techniques. For

educators, students, and researchers working on various facets of education, PBE has been found to be up to 97% successful and has real-world applications (Rusek, 2021).

The study explores into the significant experiences of grade 12 STEM students at Gumaca National High School, it reveals that working together on projects with friends helps students grasp challenging concepts more deeply. In experiencing PBL students are more capable to actively engage in real world activities to strengthen their foundations for the upcoming college years as well as gain insights and knowledge.

The research shows how PBL help students to develop their cognitive abilities, increase their knowledge of relationships, and experiential reasoning skills. Participants shared that PBL has given them more self-assurance, empowerment, and opportunities to master practical skills. However, obstacles and problems with the implementation of PBL have also been noticed. These includes the lack of knowledge among students and educators regarding PBL and insufficient funding and resources in school. The findings stress the value of providing the right materials and tools, fostering a welcoming and conducive learning environment, and addressing pressures and distractions that could impair students' learning outcomes.

The study also highlights the significance of employing efficient teaching techniques, utilizing cutting-edge methods and technologies, and comprehending how educational policies and reforms affect instructional methods and student learning outcomes. Student learning experiences are found to be influenced by peer interactions, mentoring, and advisor support. Time limits, competing demands, and extracurricular commitments can also have an impact on students' capacity for in-depth learning and time management.

Overall, the studies under consideration offer insightful information about the efficacy and implications of project-based learning, emphasizing the necessity of careful implementation, encouraging learning settings, sufficient resources, and ongoing research and innovation in instructional techniques.

## Conclusion

The overall conclusion suggests that project-based learning is growing but still in the process of development as a means to enhance student learning. As a result, we can draw the following inference from the research whereas:

A lot of students are unaware of the use of project-based learning at their educational institutions. This lack of knowledge may be caused by several things, such as poor communication, little exposure to the PBL's guiding principles and advantages, or a general ignorance of the teaching approach itself.

The environment has a significant impact on how well students learn and comprehend. A supportive setting encourages focus, engagement, and motivation, which supports efficient learning outcomes. The design of the classroom, the amount of noise, the amount of light, and the available materials all affect the learning environment.

Due to a variety of reasons, some participants are emotional while discussing their experiences. These include the enormous pressure they feel to meet their academic obligations, their challenging financial condition, and the absence of parental support. The mental health of the pupils is significantly impacted by these situations, which causes them to exhibit more intense emotional reactions.

The success of project-based learning is significantly influenced by government efforts and legislation. Its influence can be increased with adequate financing and resources dedicated to education, as well as with clear instructions and assistance for putting PBL into practice. Further enhancing its efficacy are policies that place a high priority on flexible curricular, teacher development, and assessment techniques that adhere to PBL principles. On the other hand, PBL's successful implementation and results at educational institutions may be hampered by a lack of government backing and funds. As a result, the degree to which the government is actively involved and supportive will determine how well PBL promotes student learning and participation.

In conclusion, the research emphasizes how important it is to match PBL with curriculum standards and learning objectives. PBL helps students get a deeper comprehension of the subject matter while also fostering the development of crucial 21st-

century skills when it is created with clear learning objectives in mind. The disregard of project-based learning is clearly seen as a crucial factor in its effectiveness. Moreover, the proper implication of PBL can encourage active learning and student engagement in improving students' ability to think critically and solve problems. PBL encourages greater understanding and long-term information retention by incorporating real-world difficulties into the learning process.

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