P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.93
IJPESH 2025; 12(5): 244-249

https://www.kheljournal.com
Received: 10-08-2025
Accepted: 05-09-2025

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Effects of learning related factors on the level of academic performance of students in physical education

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DOI: https://www.doi.org/10.22271/kheljournal.2025.v12.i5d.3984

Abstract
This study examined the performance of Grade 10 students in Physical Education (PE), focusing on evaluating teacher-related, school-related, and student-related factors. Using a quantitative research approach, data were collected from 142 respondents via survey. Teachers generally demonstrate effective pedagogical practices in PE, using engaging methods like game-based learning, but there is room for improvement in integrating technology and fostering student self-reflection. Schools provide a solid foundation of learning materials and multimedia resources for PE, though access to digital tools and more interactive resources like games could enhance student engagement. Students display a positive attitude and motivation toward PE. However, their responsibility for personal fitness and their approach to feedback-seeking could be further developed through targeted strategies and supportive teaching methods. Statistical analyses revealed that while teacher-related factors (pedagogy, teaching materials, and assessment) had negligible correlations with PE performance, school-related factors like learning materials and sports equipment, along with student factors such as attitude and motivation, showed small but significant correlations with performance ($p<0.05$). The study concluded that improving technology integration, enhancing the availability and use of learning resources, and fostering a positive student attitude and motivation are essential for boosting PE outcomes, and it provided recommendations for targeted interventions in these areas. Additionally, future research could further explore the role of other factors, including teacher competencies and community support, in shaping student success in PE.

Keywords: Physical education, school related factors, student related factors, teacher-related factors

Introduction
Physical education is crucial in fostering an understanding of the significance of maintaining a healthy lifestyle among pupils. Participating in physical activity and exercise positively impacts one's overall health and boosts other dimensions of well-being. The advantages include heightened aerobic capacity, enhanced balance, improved gross motor skills, muscle fortification, and overall quality of life (Stancliffe & Anderson, 2017) [1]. Acknowledging that a lack of physical activity is a substantial factor in developing conditions such as overweight and obesity underscores the importance of integrating regular exercise into daily schedules (Lenz *et al.*, 2015) [2]. According to Gasperetti *et al.* (2018) [3], evidence indicates that students who possess motivation and stimulation to engage in physical exercise are more inclined to allocate their time to participate in physical activities. This finding proves that physical education benefits everyone's health, especially students.
Furthermore, physical activity is a potent mechanism for students to effectively regulate personal stress, providing them with a wholesome avenue to navigate the difficulties associated with adolescence (Barney *et al.*, 2019) [4]. Physical education enhances students' overall well-being, encompassing physical health and holistic development. Consequently, it is essential to their educational experience and broader life journey.
Various literature has discussed the impact of teaching-related, school-related, and student-related variables on academic achievement in physical education and has predominantly concentrated on many facets of the shift toward online and remote learning amid the COVID-19 epidemic. The study by Harris and Metzler (2019) [6] brought attention to

the correlation between online physical education and established criteria while noting a modest adherence level in some domains. The study conducted by Williams *et al.* (2020) [12] focused on evaluating student perspectives on traditional physical education compared to online physical education. The researchers underscored the significance of assessing student knowledge and maturity in this context. The study conducted by Yu and Jee (2021) investigated the experiences of both teachers and students in the context of online physical education. The researchers emphasized the importance of pre-planning, feedback, and student participation in this educational setting. The study by Jumareng *et al.* (2021) [7] examined the viewpoints of university students about online learning and practical experiences. The authors recognized both obstacles and benefits associated with this mode of education.

Similarly, Amran *et al.* (2021) [14] investigated student perceptions of the effectiveness and motivation of online learning and practical experiences. The study conducted by Johnson *et al.* (2021) [8] examined the difficulties encountered by physical education educators in adapting to online instructional methods, emphasizing the necessity for assistance. Vilchez *et al.* (2021) [9] conducted interviews with instructors, highlighting the themes of customization, flexibility, and professional development. These studies offer significant contributions in elucidating the effects of the epidemic. However, there needs to be more research to comprehend the more comprehensive and enduring consequences of these elements on academic achievement in physical education, extending beyond the pandemic setting.

Various factors influence students' learning experiences (Casinillo *et al.*, 2020) [15]. Considering the research gaps previously mentioned, there is a need to reinvestigate these factors so that the system can reevaluate and adapt educational programs and institutions in response to a changing academic landscape (MacPhail, 2020) [16]. The present study explores various learning-related factors that could influence performance in Physical education. Discussions and recommendations shall be provided using the lens of a post-pandemic educational system that responds well to the physical and health needs of the learners.

Conceptual Framework

Figure 1 shows the research paradigm.

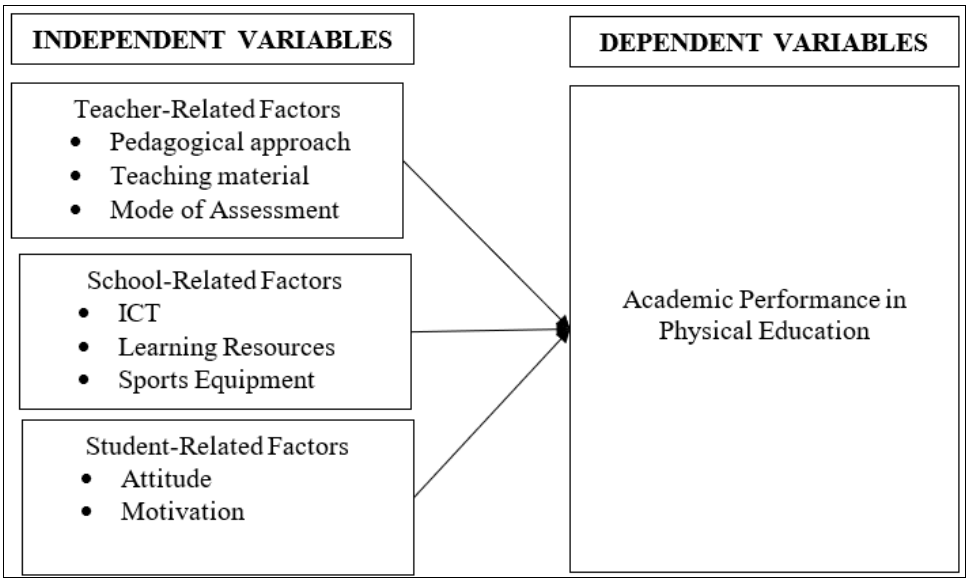

Fig 1: Conceptual Paradigm

The study has three main independent variables under learning-related factors. The first variable is for the teacher-related factor, which includes pedagogical approach, teaching materials, and mode of assessment. The second variable is for the school-related factors, which include ICT, learning resources, and sports equipment. Finally, the third independent variable is for the student-related factors, which include attitude and motivation.

On the other hand, the study has one dependent variable: the student's academic performance in Physical Education. This variable is measured using the quarterly grade of the learners in their PE subjects. The study aims to find the correlations between the learning-related factors and the learners' academic performance.

Significance of the Study

The methods used, data gathered, insights offered, and recommendations provided would be beneficial to the following:

Students: This study carries substantial significance for students as it pertains directly to their academic achievement in Physical Education. The study examined many factors associated with learning, including those connected to teachers, schools, and students. Its objective is to identify specific areas within Physical Education classes where improvements can be made to enhance the overall quality of education. The provided information holds significant potential for students, as it can yield advancements in pedagogical approaches, enhance resource accessibility, and foster a more conducive learning milieu. The student-respondents of the study were able to provide their insights and opinions about the PE curriculum thus giving them a voice for teachers and management to hear by participating in the survey. By comprehending the impact of these variables on academic achievement, pupils can experience a more immersive and efficient educational journey, resulting in improved abilities, drive, and perspectives about physical education. In conclusion, this study's results can potentially enhance students' comprehensive educational development and welfare.

Teachers

This study is significant for educators since it provides valuable insights into multiple facets of their instructional methodologies. Educators can acquire helpful feedback regarding their instructional practices through a comprehensive analysis of pedagogical methods, teaching materials, and assessment systems. Understanding how these elements impact students' academic performance can provide teachers with valuable insights to make appropriate modifications to enhance learning. Furthermore, the research may underscore the importance of successfully employing ICT technology and optimizing learning resources. This study could enhance teachers' ability to improve their instructional strategies, resulting in enhanced student performance and a more stimulating and effective learning atmosphere.

School Administrators

School administrators' involvement is paramount in influencing the comprehensive educational milieu. The significance of this study for school administrators is its capacity to provide valuable insights for policymaking and the allocation of resources. Through an extensive analysis of several elements of schools, such as information and communication technology (ICT), learning resources, and sports equipment, educational administrators can discern certain areas that necessitate investment and enhancement. Furthermore, a comprehensive comprehension of the influence exerted by these aspects on academic achievement can facilitate the formulation of efficacious methodologies aimed at augmenting the educational standards within the realm of Physical Education courses. The findings that will be derived by the study have the potential to provide valuable guidance to administrators in the development of an optimal learning environment that promotes positive student attitudes, motivation, and academic achievement. These factors can significantly contribute to the school's educational success and reputation.

Department of Education

This study is of considerable importance to the Department of Education as it offers valuable insights into the elements that impact the academic achievement of Grade 10 students in Physical Education. Through an analysis of aspects of teachers, schools, and students, this study has the potential to provide valuable insights to the department regarding the prevailing strengths and shortcomings within the present educational system. This information has the potential to provide valuable guidance to the department in formulating specific policies and actions aimed at improving the overall quality of Physical Education programs implemented in various schools. Furthermore, it facilitates the synchronization of instructional approaches, distribution of resources, and formulation of educational programs to address the distinct requirements and obstacles students and educators encounter. In conclusion, this research endeavor has the potential to make a valuable contribution toward the department's overarching objective of delivering a comprehensive and impactful educational experience to every student.

Curriculum Planners: Curriculum planners assume a crucial role in developing educational programs that address the specific requirements of students and foster their academic achievements. The value of this study for curriculum planners rests in its potential to provide valuable insights for the development and improvement of Physical Education courses. By comprehensively grasping the influence of pedagogical approaches, teaching materials, and assessment systems, curriculum designers can develop more captivating and efficient curricula that harmonize with students' individual learning preferences. Moreover, a deeper understanding of school-related variables such as information and communication technology (ICT), learning resources, and sports equipment can contribute to allocating resources effectively and improving the curriculum. Curriculum planners can utilize this research to develop a Physical Education program that is more comprehensive and student-centered, thereby enhancing students' readiness for academic achievement and long-term physical health.

Community

The community plays a crucial role as a stakeholder in the field of education, and this study bears considerable importance for individuals within the community. By examining the various elements that impact students' academic performance in PE, the main goal of the endeavor is to provide insights that can enhance the community's comprehension of the complexities and potentialities within the local educational framework. Community members can utilize the knowledge acquired to lobby for enhancements in school infrastructure, educational resources, and pedagogical approaches. Additionally, implementing a comprehensive Physical Education curriculum can foster the physical health and overall well-being of young individuals within the community, contributing to the cultivation of a future generation that is both healthier and more engaged in physical activity. This study's findings can empower the community by encouraging active involvement with schools and education authorities. This involvement can guarantee that kids are provided with a high-quality physical education program, which can contribute to their holistic development.

Future researchers

The findings of this study can serve as a foundation for further research, enabling scholars to explore more comprehensively the various teaching-related, school-related, and student-related factors that influence academic achievement. This approach facilitates the exploration of longitudinal research, comparative analysis, and interventions to further enhance the overall quality of Physical Education. Moreover, the methods and approach employed in this study have the potential to serve as a paradigm for future research conducted in educational settings. This study would enable researchers to explore aspects comparable to those of other grade levels or disciplines. The significance of this study for future research resides in its capacity to stimulate and direct further academic investigations focused on enhancing educational outcomes and practices.

Objectives of the study

1. The following are the objectives of the study:
2. Describe teacher-related factors (pedagogy, materials, assessment).
3. Describe school-related factors (ICT, resources, equipment).
4. Describe student-related factors (attitude, motivation).
5. Determine the students' academic performance level in PE.
6. Analyze the impact of learning-related factors on performance.
7. Discuss the implications of the findings for PE."

Methods and Techniques of the Study

To evaluate student performance in physical education, especially when using competency-based strategic intervention materials, this study used a quantitative methodology. To find patterns, connections, and trends in a particular field, quantitative research focuses on gathering and statistically analyzing numerical data (Aliaga & Gunderson, 2002) [19]. The study used a descriptive research approach to accomplish this, which is useful for methodically recording and examining particular aspects of a phenomenon without changing the variables being studied (Creswell, 2009; Creswell & Creswell, 2017) [18, 20]. In addition to offering important insights on the efficacy of instructional interventions, this non-experimental approach allows researchers to accurately record students' abilities and academic progress (McCombes, 2020) [20]. Descriptive research is also essential to education since it provides the groundwork for subsequent study aimed at improving curriculum creation, teaching methods, and student engagement tactics. The results of the study support evidence-based decision-making in physical education by highlighting the value of customized learning resources in promoting student success.

A correlational research methodology was also used in this study, which is crucial for analyzing the relationships and interdependencies among various variables (Creswell & Creswell, 2017) [20]. Without using direct manipulation or intervention, this approach enables researchers to determine whether changes in one component correlate with changes in another. In educational contexts, where experimental manipulation may not be practical due to ethical or logistical constraints, correlational research is very helpful. This method offers valuable insights that can guide curricular modifications, instructional practices, and policy decisions targeted at improving student learning outcomes by determining the direction and strength of correlations between variables.

Population and Sample of the Study

The main population of the study was the 502 grade 10 students at Bataan National High School, Schools Division of City of Balanga, S. Y. 2024-2025. Using the priori test of the GPower software, set at 95% statistical power and medium effect size, the study selected 142 respondents from the population.

Data Gathering Procedure

The researcher sought permission from the Schools Division Superintendent of City of Balanga to conduct the undertaking. After approval, a letter was sent to the school principal to conduct the study. This study employed the survey research method to collect the quantitative data needed. The survey method is a research technique used to gather information and data by asking questions from a predetermined set of questions to a sample or population of individuals (Fowler, 2013) [21]. It is a structured data collection method that typically involves systematically collecting questionnaires or interviews to collect data on various topics or variables of interest. The survey questionnaire was distributed through the online platform Google Forms, enabling remote data collection while prioritizing the safety and convenience of the participants. A printed version of the instrument was provided for students with difficulty accessing the internet. These printed questionnaires were distributed and collected from the target respondents with the assistance of their classroom advisers. A time allotment of two weeks was considered to give ample time for the respondents to return the complete questionnaire.

Presentation, analysis, and interpretation of data

This chapter presents the results and discusses the findings. The presentation follows the sequence of specific research problems.

Table 1: Summary of teacher-related factors

Factors	Mean	Interpretation	Rank
Pedagogy	3.48	Good level of practice	1
Learning Materials	3.30	Good level of practice	2.5
Assessment	3.30	Good level of practice	2.5
Overall	3.36	Good level of practice	

It can be seen that among the teacher-related factors, "Pedagogy" has the highest mean of 3.48, interpreted as a "Good level of practice" and is ranked first. Both "Learning Materials" and "Assessment" have the same mean of 3.30, also interpreted as a "Good level of practice," and are tied in second place. The overall mean of 3.36 suggests that, overall, teacher-related factors are observed at a good level of practice.

Table 2: Summary of school-related factors

Factors	Mean	Interpretation	Rank
ICT	3.10	Observable	2
Learning Materials	3.29	Observable	1
Sports Equipment	2.32	Somehow observable	3
Overall	2.90	Observable	

The table summarizes the school-related factors, with "Learning Materials" receiving the highest mean of 3.29, interpreted as "Observable" and ranked first. "ICT" follows with a mean of 3.10, and "Observable" ranks second, while "Sports equipment" ranks last with a mean of 2.32, interpreted as "Somehow observable." The overall score for these factors is 2.90, indicating that the school-related factors are generally observable but with notable areas requiring improvement.

Table 3: Summary of student-related factors

Factors	Mean	Interpretation	Rank
Attitude	3.49	Observable	1
Motivation	3.40	Observable	2
Overall	3.45	Observable	

Table 3 summarizes the student-related factors, with the "Attitude" factor having the highest mean of 3.49, interpreted as "Observable." This finding places attitude in the first rank, followed by motivation, which has a mean of 3.40, is also deemed "Observable," and is ranked second. The overall score for these factors is 3.45, indicating that Attitude and Motivation are observable and generally positive.

Performance of the Learners

Table 4 presents the learners' performance regarding the weighted grade average in Physical Education.

Table 4: Weighted grade average in Physical Education

Range	Frequency	Percentage	Description
90-100	129	90.85	Outstanding
85-89	13	9.15	Very Satisfactory
Overall WGA		94.01	Outstanding

Conclusion

The study highlights strengths in teacher-related factors, such as effective pedagogical practices emphasizing safety and engagement through game-based learning, though technology integration and reflective assessments need enhancement. Schools demonstrate robust curricular resources and ICT tools but lack reliable internet access, dedicated ICT support, and modern sports facilities, limiting program diversity. Students exhibit positive attitudes and motivation toward PE, valuing teamwork and personal growth, yet require structured guidance to strengthen goal-setting, feedback-seeking, and proactive ownership of fitness goals, indicating opportunities for more tailored instructional strategies.

The study found a correlation between the learning-related factors and the academic performance of Grade 10 students in Physical Education at Bataan National High School during SY 2024-2025. It was revealed that teacher-related factors, including pedagogy, teaching materials, and mode of assessment, have no significant correlation with performance in PE. However, it was found that school-related factors, which include learning materials and sports equipment, significantly correlate with performance in PE. Furthermore, student attitudes toward ICT and motivation have significant correlations with academic performance in PE.

Recommendations

Based on the findings of the study, the following are recommended:

1. Teachers are less likely to integrate technology such as fitness apps and wearable devices into physical education classes. To address this, schools can train teachers on incorporating technology effectively and offer access to user-friendly fitness tools. Progress can be measured by tracking the frequency of technology use in PE classes and assessing student engagement levels through surveys.
2. The limited use of digital resources and multimedia tools in PE lessons highlights a gap in learning material availability. Schools can allocate resources to procure digital materials and train teachers to incorporate them into lessons. This can be measured through increased use of digital content during classes and student feedback on lesson quality.
3. Reflective journals and portfolios are less utilized as an assessment tool in PE, suggesting limited opportunities for students to document their growth. Teachers can introduce regular journaling activities where students reflect on their progress, supported by guidelines and feedback. The effectiveness can be tracked by analyzing the quality of submissions and observing improvements in student self-awareness over time.
4. Teachers' participation in research activities related to PE is limited, pointing to a gap in professional development. Schools can encourage teachers to engage in collaborative research projects by providing funding, time, and mentorship. The success of this initiative can be measured by the number of research outputs produced and their application in improving teaching practices.
5. The lack of dedicated ICT support in schools impacts the effective use of technology in PE. Schools should establish ICT support teams to assist teachers with troubleshooting and ensuring the proper functionality of digital tools. The impact can be measured by recording reduced technical issues reported and increased teacher confidence in using technology.
6. Interactive learning materials like games and simulations are underutilized, reducing engagement opportunities in PE. Schools can invest in interactive tools and train teachers to incorporate them into their lessons. Progress can be measured by observing student participation and enjoyment levels during activities using these resources.
7. A significant lack of sports equipment, such as gym facilities and safety gear, affects the quality of PE activities. Schools can prioritize funding and partnerships to acquire essential equipment and maintain regular maintenance. The improvement can be monitored through an inventory check and increased participation in sports requiring specific equipment.
8. Students show less engagement in independent fitness activities, suggesting a need for more self-directed opportunities. Teachers can introduce individual fitness challenges or projects that allow students to set and pursue personal goals. Success can be tracked by evaluating student completion rates and improvements in fitness assessments.
9. Students demonstrate relatively lower responsibility for personal fitness, indicating a need for more accountability measures. Teachers can integrate fitness logs where students track their activities and progress, which instructors review periodically. This can be measured by student entries' consistency, quality, and alignment with fitness goals.
10. The finding reveals that students seek less feedback from instructors and peers to refine their skills. Teachers can incorporate regular feedback sessions during and after activities, emphasizing constructive criticism and skill improvement. Progress can be evaluated through surveys measuring student perceptions of the usefulness of feedback and observed performance improvements.
11. The findings suggest that while ICT resources have no significant impact on student performance in PE, learning materials and sports equipment show small but meaningful contributions. Schools should focus on enhancing the availability and quality of these resources by updating textbooks and digital materials and ensuring access to well-maintained sports equipment. To measure the effectiveness of these improvements, periodic performance assessments and surveys can be conducted to evaluate how these enhancements influence student engagement and outcomes in PE.
12. The results indicate that both attitude and motivation play significant roles in enhancing student performance in PE, albeit with a small impact. Schools should implement

programs to foster a growth mindset and intrinsic motivation among students, such as goal-setting workshops and recognition systems for effort and progress in PE. The effectiveness of these initiatives can be assessed through regular attitude and motivation surveys, as well as monitoring improvements in PE performance metrics over time.

13. Future research should explore the interplay of other potential factors, such as teacher competencies, parental support, and community resources, in influencing student performance in PE. Longitudinal studies could also examine how changes in school-related and student-related factors over time impact PE outcomes. Additionally, qualitative approaches like interviews or focus groups may provide deeper insights into how attitudes, motivation, and resource availability shape students' experiences and performance in PE.

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