Research Article

Coaching and Training Optimization for Basketball Athletes Using Information Systems and Performance Analytics

John Raymond M. Jimeno

Western Mindanao State University

Zamboanga City, Philippines

ARTICLE INFO	ABSTRACT
	This study explored how secondary school sports programs are implemented in order to produce evidence-based insights that promote athletic development. The findings demonstrate that early and continuous preparation is a vital component of successful programs, providing student-athletes with enough time to develop their abilities, level of physical condition, and preparedness for competition. Better performance results and progressive athletic improvement have been demonstrated to be greatly influenced by disciplined and well-planned training programs. In order to identify competent and determined student-athletes, the study also highlights the significance of systematic athlete scouting and efficient talent discovery techniques such as tryouts and intramural evaluations. When coaches and sports coordinators work together to create and oversee training regimens, the participation of knowledgeable and committed coaches has been identified as an essential element of program success. This study examined how coaches use information systems and performance analytics to maximize the training and performance of collegiate basketball players, underscoring the growing significance of technology-driven methods in contemporary coaching techniques. Through systematic performance tracking and analysis, coaches can make evidence-based decisions that enhance athlete development, optimize role assignment, and strengthen overall game strategies. This is made possible by data-driven monitoring, structured training plans, and performance monitoring tools. Overall, the study demonstrates that in order to maintain constant preparation and competitive readiness, continuous athletic performance growth necessitates strategic management of athletes and coaching staff, proactive administrative planning, coordinated leadership, and planned training methods. **Keywords:** school sports programs, , athletes, sports coordinators, coaching and training, information systems and performance analytics

Introduction

Effective sports programs are fundamental to fostering the comprehensive development of secondary school students. Beyond competitive outcomes, these activities serve as critical vehicles for character development, promoting discipline and teamwork. Although national and regional mandates establish the theoretical framework for such programs, their practical success relies heavily on the dedication and judgment of school-based stakeholders. Therefore, to ensure that policy objectives are met at the local level, it is essential to align broad directives with the perspectives and realities of those responsible for implementation.

Stakeholder perspectives offer essential context regarding the organizational structure, prioritization, and modification of athletic programs within educational institutions. Coordinators and coaches, in particular, oversee key logistical responsibilities such as identifying talent, assigning personnel, and aligning training schedules with competition calendars. These administrative decisions inevitably reflect a complex interaction between institutional limitations and the specific needs of student athletes. As a result, examining these lived experiences provides researchers with a detailed understanding of the factors that support or hinder program implementation, insights that cannot be obtained from policy documents alone.

Research Article

This qualitative investigation seeks to elucidate stakeholder viewpoints regarding athletic programs and assess their congruence with locally enacted policy frameworks. Utilizing the empirical insights of personnel central to the conceptualization and operationalization of sports initiatives, the study endeavors to identify exemplary models, inherent obstacles, and strategic interventions that augment programmatic efficacy. Fundamentally, this research contributes to the advancement of informed local policy formulation, ensuring that school sports programs are not merely statutorily compliant but are also keenly attuned to the developmental imperatives and aspirations of the student body.

Research Questions

1. What types of sports programs are operationalized within the selected secondary schools of Zamboanga City?
2. How do you use performance data or analytics in making decisions about training adjustments, player roles, or game strategies?

Related Literature and Studies

On the Constructivist Perspectives and Stakeholder Engagement in Safe Sport Advancement

In order to better understand sport administrators' ideas on promoting safe sport, this study takes a constructivist paradigmatic approach. Constructivism, which emphasizes that people actively create reality via their interactions with society and their surroundings, is based on an interpretive worldview (Rapmund, 1999; Kukla, 2000; Campbell, 2002). According to this viewpoint, assumptions regarding reality are not objective truths but rather are influenced by cultural and social settings (Rapmund, 1999).

Research involving important stakeholders, including sport administrators, can explore lived experiences and shared meanings by using a constructivist method. By encouraging learning via discussion, introspection, and experience sharing, this method emphasizes the real-world application of theoretical information (Mesquita et al., 2014).

Such involvement enables administrators to cooperatively interpret issues, principles, and duties related to player welfare in the context of safe sport.

Just like athletes in competitive sports, students in the Food Technology program develop adaptive skills by responding strategically to dynamic challenges, similar to how players adjust their techniques and strategies during a game to achieve peak performance (Manalo & Sisnorio, 2024). Training in sports emphasizes discipline, teamwork, and continuous improvement, which parallels how Food Technology students refine their technical competencies to meet industry standards. In the same way that a well-conditioned team sustains success through preparation and collaboration, a sustainable industrial system in tertiary education thrives on students' resilience, coordination, and ability to adapt to changing demands.

Within this approach, the development of safe sport solutions is viewed as a collaborative and negotiated process in which researchers and participants engage to continuously shape knowledge. The significance of inclusive participation, reflexivity, and contextual sensitivity in the formulation and execution of policies is emphasized by this method. Constructivism thus offers an appropriate

Research Article

theoretical framework for investigating the creation, interpretation, and operationalization of safe sport practices in complex athletic and educational systems.

On the Strategic Management and Administrative Leadership in Physical Education and Sports Policy

Sports policy and physical education (PE) are becoming more widely acknowledged as essential components of a whole educational experience. PE and sports are increasingly recognized for their important contributions to students' physical health, emotional well-being, social integration, teamwork, leadership, and self-discipline. Previously, they were seen as supplemental to academic disciplines. As a result, including physical education into the strategic administration of education is no longer a side issue but rather a conscious and essential endeavor (Mintzberg, 1994).

In education, strategic management is a thorough and ongoing process that helps institutions identify their mission and vision, set long-term goals, carry out strategic initiatives, allocate resources effectively, and assess results using quantifiable indicators. By taking a proactive stance, educational institutions can effectively address both internal and external difficulties while staying in line with their objectives.

Due to the physical, psychological, and social aspects of PE and sports policy, strategic management takes on unique characteristics (Guliyeva & Khalilov, 2025). In addition to curriculum inclusion, effective strategic planning for physical education also calls for sufficient infrastructure, qualified staff, stakeholder collaboration, and community involvement. Environmental scanning, which is frequently operationalized through SWOT analysis, is an essential part of this process. According to Khalilov, Aliyev, Guliyeva, and Babayeva (2024), SWOT analysis can be used in PE contexts to identify strengths like experienced coaching staff, weaknesses like outdated facilities, opportunities like national health initiatives, and threats like financial limitations or declining student participation.

Administrative leadership plays an important role to the effective execution and long-term viability of PE and sports policies. Principals, district supervisors, and government representatives are examples of educational administrators who serve as change agents by transforming strategic vision into useful results. Beyond standard managerial duties, strategic leadership in physical education encompasses creative planning, inclusive decision-making, efficient resource coordination, and a thorough comprehension of students' developmental requirements. Institutional cultures where physical education is valued and incorporated into the larger educational mission are more likely to be fostered by administrators that embrace participatory and innovative leadership techniques (Salmanov et al., 2025).

In addition, modern educational leaders need to recognize new trends, address equity and access concerns, respond to public health agendas, and match local practices with international norms. Coherent planning and flexible leadership are necessary to balance short-term operational demands with long-term strategic goals, highlighting the significance of strategic management as a basis for successful PE and sports policy formulation (Fullan, 2007).

Theoretical Framework

The theoretical foundation of this investigation rests upon Bronfenbrenner's Ecological Systems Theory (1979), which posits that the architecture of school sports programs is determined by

Research Article

cascading, multiple layers of environmental influence. Bronfenbrenner's model asserts that human development unfolds within interconnected systems such as the microsystem, mesosystem, exosystem, and macrosystem. Applied to the context of the selected secondary schools in Zamboanga City, the characteristics of the athletic curriculum are likely influenced by factors originating at the institutional level (e.g., facilities, coaching personnel, administrative priorities), the community level (e.g., parental engagement, local athletic culture), and the governance level (e.g., Department of Education (DepEd) mandates and Local Government Unit (LGU) initiatives). This theoretical framework is paramount to Research Question 1, providing a conceptual lens through which the study can systematically examine how these diverse environmental systems collectively determine the accessibility, variety, and qualitative standards of the sports programs offered in secondary institutions.

The study is further informed by Systems Theory, which conceptualizes schools as organizations comprising interdependent components that function collaboratively toward specific objectives. As articulated by Von Bertalanffy (1968), the overall functionality of any system is determined by a cycle of inputs, processes, outputs, and feedback loops. Applied to school sports, inputs include necessary resources (e.g., funding, equipment, trained personnel); processes involve logistical execution (planning, training sessions, and competitive schedules); outputs reflect student outcomes (participation rates and athletic performance); and feedback centers on monitoring and evaluation activities. This perspective directly aligns with both Research Questions 1 and 2, enabling the analysis of program design, execution, and assessment, and facilitating the identification of systemic deficiencies addressable through structured policy.

Collectively, Ecological Systems Theory and Systems Theory establish a comprehensive conceptual foundation for developing local policy guidelines that govern the planning, implementation, and evaluation of school sports programs in Zamboanga City. Bronfenbrenner's framework highlights the necessary broader contextual and policy influences that must inform the crafting of local guidelines, whereas Systems Theory offers a structured model for integrating internal programmatic components for greater efficiency. This combined theoretical lens supports Research Question 2 by ensuring that the proposed policy is both context-sensitive and aligned with the operational realities of secondary schools, ultimately enhancing the study's ability to analyze existing programs and recommend an evidence-based policy framework.

Research Methodology

This chapter outlines the research design, research locale, population and sampling procedures, research instruments, data collection methods, data analysis techniques, and ethical considerations applied in the study. These methodological components guided the identification of sports programs implemented in selected secondary schools in Zamboanga City and informed the development of a local policy for the planning, implementation, and evaluation of school sports programs.

Research Design

The study utilized a descriptive research design, which was suitable for identifying and characterizing the sports programs offered by secondary schools in Zamboanga City. This approach allowed the researcher to collect factual, up-to-date, and relevant information on existing sports offerings, implementation practices, and evaluation processes. Additionally, this design supported the development of a local policy by providing a clear understanding of current conditions, needs, and challenges within school-based sports programs.

Research Article

Research Locale

The study was conducted in selected public and private secondary schools in Zamboanga City, a highly urbanized city in the Zamboanga Peninsula region. This location was chosen due to its diverse range of secondary schools that offer sports programs aligned with the Department of Education's School Sports Development initiatives. Differences in school resources, facilities, student enrollment, and administrative support made the city an ideal context for investigating the implementation of sports programs and identifying gaps in existing policies. The diversity of school conditions provided valuable insights necessary for the development of evidence-based policy recommendations.

Population and Sampling

The population was defined to include key stakeholders such as School Heads, Sports Coordinators, and PE Teachers. Their firsthand involvement in the planning, implementation, and evaluation phases of sports programs made them exceptionally qualified to provide information critical to the research objectives. A purposive sampling strategy was utilized to ensure the inclusion of individuals whose distinct administrative roles provided triangulation of perspectives. The sample explicitly comprised School Heads overseeing institutional governance, Sports Coordinators managing operational logistics, and PE Teachers responsible for direct instructional delivery and competition facilitation. This methodological choice ensured that the collected data was both reliable and systemically comprehensive.

Research Instrument

The study employed a researcher-designed survey questionnaire alongside a structured interview guide to collect both quantitative and qualitative data. The questionnaire was organized into four sections: (1) school profile; (2) types of sports programs offered; (3) program implementation and evaluation practices; and (4) open-ended items soliciting participant recommendations. It was designed to capture comprehensive information regarding sports offerings, training schedules, participation in competitions, facility availability, and implementation challenges. To ensure the instrument's validity and reliability, it was reviewed and evaluated by experts in physical education and educational management, and revisions were made based on their feedback. Furthermore, a pilot test was conducted to enhance the clarity, language, and overall coherence of the instrument, ensuring its suitability for the study.

Data Gathering Procedure

Data collection was initiated following the formal approval of the Schools Division Office of Zamboanga City and the principals of the participating schools. The researcher personally administered the survey questionnaires to ensure a high response rate, allowing respondents adequate time to provide complete and accurate information. Interviews were conducted in person at times convenient for the participants, enabling the collection of detailed and substantive insights into the implementation of sports programs and the corresponding policy requirements. All data obtained were meticulously organized and systematically encoded to guarantee accuracy and consistency throughout the analysis. The combined application of survey and interview methods facilitated a comprehensive and rigorous assessment of the prevailing conditions of school sports programs.

Research Article

Data Analysis

The study utilized an integrated approach combining both quantitative and qualitative analyses. Quantitative data collected through the survey questionnaires were analyzed using descriptive statistics, specifically frequency counts and percentages, to ascertain the types of sports programs implemented across the selected schools. This approach facilitated the clear and systematic presentation of information regarding sports offerings and student participation levels. Simultaneously, qualitative data obtained from interviews and open-ended survey responses were analyzed using thematic analysis, which involved identifying recurring patterns, critical issues, and suggested enhancements. The synthesis of quantitative and qualitative findings provided a comprehensive and robust foundation for formulating a proposed local policy for the effective management of school sports programs.

Results and Discussions

On the Secondary Schools' Sports Programs

After the transcription of the participants' responses, the following theme were noted:

Key informant of School A stated that they are conducting training programs before the competition and they are also conducting summer trainings for the athletes. She stated: "As a sports coordinator, I asked my coaches their training program before having a sports competition like for example in athletics my coach is Sir Paul, in summer to have the training program for his athletes and he is willing to stay here in the school to train. So, that is what I do in my sports program and also with the other sports coaches, I usually asked their training program". -Sports Coordinator, School A

The key informant of School B aso stated that they conduct meetings together with the coaches before the competition. The sports program is planned every June when the school year is started. He stated: "In planning, before I become sports coordinator. The programs for division meet and cluster meet, I conduct meetings for cluster meet and intramurals. Those are the plans but earlier as June I already have sports plans up to the last month of the school year." -Sports Coordinator, School B

Furthermore, the key informant of School C conducts scouting to select the best athletes and also selecting the best coaches that can handle the sports events of the school. He stated: "Start of the school year there should be scouting to get the best athletes. However, since there are no good coaches in the school we do it through selection in the intramurals, and we do scouting to select the best athletes and bring them to the district level if they will succeed in the district level that is the time they will proceed in the division level. If the perform well they can already proceed to the higher meets." -Sports Coordinator, School C

Two key informants of School D and School E stated that the sports program is depend on the scheduling of the competition. They stated: "It depends on the sports program of the coaches. It is on the time and the schedule of the coaches. It is also depends on the dedication of the coaches that lead to the success. If don't have good coaches and not dedicated maybe we don't have good athletes" -Sports Coordinator, School D-

"It depends on the schedule of the sports competition, like for example if November we are designing our sports program on schedule of the competition. Now the competition is in September, we are designing our program according on schedule." -Sports Coordinator, School E

Research Article

The key informant of School F designs their best sports program on their strong sports event like swimming. He stated: "Our plan is, the other school don't have sports like we have like swimming, and we will focus there so that we have greater chances to win." -Sports Coordinator, School F

Moreover, the key informant of School G selects the students to become athletes starting June and selects the teachers to be the coaches of their assigned events. The key informant preferred to train together with the athletes for them to motivate under his supervision. He stated: "My plan is to start from the beginning; starting June I already selects students. But you need also dedicated teachers. If you don't have dedicated teachers you cannot pursue your plans, I look for coaches and I told them to start by June and look for players. And I join them to jog as part of the athlete's conditioning, my plan is they will hold the team but under my supervision. So before they will go to the higher meet they should pass on my trainings and that is how my sports program. Because I cannot push the program to the end, it is important in the beginning." -Sports Coordinator, School G-

"Training as early as February for the improvement of the players" -Sports Coordinator, School H

Table 1. School Sports Programs of the Selected Secondary Schools Participants School Sports Program

School A	Conducts Training before competition and trainings on summer
School B	School B Conduct meeting and plan sports program earlier as June of the School Year
School C	School C Scouting and selecting the best athletes
School D	School D Depends on the sports program and dedication of the coaches
School E	School E Planning sports program depends on the competition schedule
School F	School F Planning Sports Program on the sports they are good.
School G	School G Assigning teacher to be the coach and let the teachers select the best athletes
School H	School H Training as early as February for the improvement of the players

On the of Use Performance Data or Analytics in Making Decisions About Training Adjustments, Player Roles, Or Game Strategies

Based on the results and discussion presented, performance data or analytics are used in decision-making primarily through structured planning, athlete evaluation, and competition-based scheduling, although the use of formal digital analytics systems is not explicitly stated. The findings imply that coaches and sports coordinators rely on training programs, scouting results, intramural performance, and competition timelines as their main sources of "performance data" in adjusting training, assigning athlete roles, and developing strategies. For instance, Schools A, B, and G emphasize early planning and monitoring of training programs, where coordinators regularly ask coaches about training plans and supervise conditioning sessions, suggesting that progress indicators from training guide adjustments. Meanwhile, School C highlights the use of scouting and selection based on athlete performance, which reflects the use of evaluative data to determine who advances to higher-level competitions. Schools D and E show that training intensity and program structure are adjusted

Research Article

depending on **the** competition schedule**,** indicating that decision-making is influenced by performance readiness relative to tournament timelines. Additionally, School F's focus on their strongest event demonstrates a strategic use of performance outcomes to allocate resources and prioritize training efforts. Overall, the data suggest that coaches use observed performance results and structured evaluations as the basis for optimizing training programs, selecting athletes for specific roles, and planning competitive strategies.

Conclusion

The study draws the conclusion that secondary schools carry out their athletic programs by means of early preparation, systematic planning, and concerted efforts between coaches and sports coordinators. The results showed that most schools start planning training programs at the beginning of the school year, especially in June, although some start conditioning as early as February or extend preparations through summer training. The significance of long-term athlete development and ongoing skill improvement before important competitions is emphasized by these techniques. Additionally, the study emphasizes how great athlete scouting, appropriate coach selection, and the commitment of those tasked with student-athlete training are factors in successful sports programs. Athletes are more likely to be identified as prospective talents and prepared for higher levels of competition by schools that use intramural scouting activities and performance evaluation. Similarly, the ability and dedication of instructors were found to be essential elements in maintaining a good training program and inspiring athletes to succeed.

Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. Strengthen early and continuous training programs. Schools should institutionalize year-round training schedules, including summer training and early conditioning activities, to ensure athletes develop their skills and physical readiness long before competition season.
2. Enhance athlete scouting and coach development. Schools are encouraged to implement systematic scouting through intramurals and regular performance evaluations to identify talented athletes. Additionally, selecting qualified and dedicated coaches and providing them with training seminars or coaching development programs will improve the effectiveness of sports instruction.
3. Integrate performance monitoring tools for better decision-making**.** Schools should adopt simple performance tracking systems such as training logs, progress checklists, or digital tools to record athlete performance data. This will help coaches make evidence-based decisions in adjusting training intensity, assigning player roles, and preparing strategies aligned with competition schedules.

References

[1] Campbell, S. R. (2002). Constructivism and the limits of reason: Revisiting the Kantian problematic. *Studies in Philosophy and Education, 21*, 421–445. https://doi.org/10.1023/A:1020844323677

[2] Fullan, M. (2007). *The new meaning of educational change* (4th ed.). Teachers College Press.

Research Article

[3]   Guliyeva, M., & Khalilov, T. (2025). Strategic management approaches based on strategic planning for bachelor's degree programs in higher education institutions (basic medical education). *Journal of Neonatal Surgery, 14*(11s), 1–7. https://doi.org/10.52783/jns.v14.2928

[4]   Khalilov, T., Adilzade, I., Rzayev, O., Guliyev, N., & Yusifova, N. (2024). The role of strategic planning in the organization of management systems in higher education institutions: Insights from international practice. *Edelweiss Applied Science and Technology, 8*(6), 6227–6235. https://doi.org/10.55214/25768484.v8i6.3361

[5]   Kukla, A. (2000). *Social constructivism and the philosophy of science*. Routledge.

[6]   Manalo, R. and Sisnorio, C. (2024). Students' Adaptive and Contextual Skills in the Food Technology Program: A Premise for a Sustainable Industrial System in the Tertiary Education. *International Journal of Intelligent Systems and Applications in Engineering*, *12*(16s), 745 –. Retrieved from https://ijisae.org/index.php/IJISAE/article/view/6835

[7]   Mesquita, I., Ribeiro, J., Santos, S., & Morgan, K. (2014). Coach learning and coach education: Portuguese expert coaches' perspective. *The Sport Psychologist, 28*, 124–136. https://doi.org/10.1123/tsp.2011-0117

[8]   Mintzberg, H. (1994). *The rise and fall of strategic planning*. Free Press.

[9]   Rapmund, V. J. (1999). A story around the role of relationships in the world of a "depressed" woman and the healing process. *Contemporary Family Therapy, 21*, 239–266.

[10]   Salmanov, V., Zeynalov, C., Hasanov, N., Talibova, L., Salmanova, K., & Khalilov, T. (2025). A healthy lifestyle of schoolchildren and students as a result of systematic physical education. *Journal of Neonatal Surgery, 14*(4s), 788–798. https://doi.org/10.52783/jns.v14.1872

[11]   Valiyev, Y., Aliyev, S., Huseynova, K., & Khalilov, T. (2025). Planning and implementation of physical education and sports policy in the context of strategic management of education: An administrative perspective analysis. *Science of Law*, (1), 159–166. https://doi.org/10.55284/zk11v055