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A Comparative Study on the Effectiveness of Volleyball Training Programs For Male And Female Red Spartan Athletes of Batangas State University

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Abstract

This study examined the effectiveness of the organized volleyball training program among male and female Red Spartan athletes of Batangas State University during Academic Year 2025–2026. Specifically, it assessed the reported influence of the training program on physical performance in terms of vertical jump, agility, and strength and on tactical skill development in terms of game awareness and decision-making. The study employed a comparative research design and used total enumeration to include 54 volleyball athletes, consisting of 28 males and 26 females. Data were gathered through a researcher-developed, self-administered four-point Likert-scale questionnaire covering demographic characteristics, physical performance outcomes, tactical development, and game awareness. Weighted mean and standard deviation were used for descriptive analysis, while Kruskal–Wallis H, Mann–Whitney U, and Spearman rank-order correlation were used for inferential analysis.

The findings showed that the respondents were predominantly 19–21 years old (66.67%), with males comprising 51.85% and females 48.15% of the sample. The training program was perceived to contribute positively to vertical-jump performance, movement efficiency, volleyball-specific strength, game awareness, and decision-making. Nevertheless, lower ratings were observed for hang time, standardized agility performance, and one-minute push-up performance. Significant differences were found across age groups in strength ($H = 23.74$, $p < .001$), agility ($H = 22.98$, $p < .001$), and vertical jump ($H = 27.73$, $p < .001$). Significant male–female differences were likewise found in strength ($U = 24.00$, $p < .001$), agility ($U = 0.00$, $p < .001$), and vertical jump ($U = 33.00$, $p < .001$), with female athletes obtaining higher mean ranks in the reported comparisons. Game awareness and decision-making also differed significantly by age and sex. Strong positive relationships were reported between physical and tactical indicators.

The study concludes that the organized volleyball training program was generally effective in supporting physical and tactical development, although its outcomes varied according to athlete profile. The findings support an integrated, progressive, athlete-centered, and gender-responsive approach that combines physical conditioning with game-based tactical and decision-making activities. A Holistic Development Program for Red Spartan Volleyball Excellence is proposed as a basis for strengthening the existing training program.

Keywords: *comparative study, decision-making, game awareness, physical performance, Red Spartan athletes, tactical skills, volleyball training*

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INTRODUCTION

Volleyball at the collegiate level requires athletes to demonstrate a combination of physical fitness, technical proficiency, tactical awareness, rapid perception, and effective decision-making. The demands of competition require athletes to jump, accelerate, decelerate, change direction, defend, attack, and respond to opponents within very short periods. Consequently, an effective volleyball training program should not focus solely on physical conditioning but should also provide opportunities for athletes to develop tactical understanding, confidence, communication, and decision-making under realistic game conditions.

Previous studies cited in the dissertation indicate that structured volleyball drills, plyometric activities, strength training, and game-based exercises can improve important performance qualities such as explosive power, agility, movement control, and tactical responsiveness. Edwin and Desingurajan (2025) and Pratama et al. (2024), for example, emphasized the contribution of systematic training and plyometric exercises to agility and vertical-jump performance. Bunn et al. (2020) further demonstrated relationships between selected physical abilities and competitive performance in collegiate volleyball, while Wubale et al. (2023) highlighted the value of game-based training for improving physical qualities and skill transfer.

Tactical development is equally important. Fernández-Echeverría et al. (2021), Matos et al. (2023), and Raathod and Eaknath (2025), as reviewed in the dissertation, emphasized that athletes develop better anticipation, positioning, and decision-making when training exposes them to situations resembling actual competition. Such findings are particularly relevant to volleyball because players must continuously interpret the positions of teammates and opponents and select appropriate actions within changing rally conditions.

Gender provides another important consideration in athlete development. The dissertation review indicates that male and female athletes may respond differently to similar training conditions because of differences in physical characteristics, previous experiences, motivation, psychological factors, coaching experiences, and training exposure. Importantly, observed differences should not automatically be interpreted as evidence of inherent superiority of one sex. Instead, they can be used to identify specific strengths and training needs and to guide more individualized programming.

Within Batangas State University, the Red Spartan volleyball teams participate in organized training and competitive activities. The dissertation notes that both male and female teams generally experience comparable training conditions, yet differences have been observed in competitive outcomes and athlete responses. Despite the existence of structured training, limited local evidence has examined whether male and female Red Spartan athletes report similar or different outcomes from the same institutional training environment.

The study was therefore undertaken to determine the effectiveness of the volleyball training program among male and female Red Spartan athletes. It specifically examined physical performance in terms of vertical jump, agility, and strength; tactical development in terms of

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game awareness and decision-making; differences when grouped according to age and sex; and relationships between physical and tactical indicators. The results were intended to provide an empirical basis for improving the university's volleyball training program and for developing more responsive strategies for both male and female athletes.

The study was conceptually anchored in the Constraint-Led Approach and Gender Schema Theory. The Constraint-Led Approach emphasizes the interaction of individual, environmental, and task constraints in the development of movement and skill, while Gender Schema Theory provides a lens for understanding how gender-related experiences and expectations may influence participation, confidence, motivation, and responses to training. Together, these perspectives support the development of training environments that are adaptable to athletes' needs rather than relying on a single uniform approach.

Statement of the Problem

The study sought to determine the effectiveness of volleyball training program for male and female Red Spartan Athletes.

Specifically, it sought to answer the following questions:

1. What was the demographic profile of the respondents in terms of:

1.1 age, and

1.2 sex

2. How did the structured volleyball training program at Batangas State University affect the physical performance outcomes of Red Spartan athletes in terms of:

2.1 vertical jump;

2.2 agility; and

2.3 strength?

3. In what ways did the volleyball training regimen among male and female athletes influence tactical skill development such as:

3.1 game awareness; and

3.2 decision-making?

4. Was there a significant difference on the effect of structured volleyball training program at Batangas State University in the physical performance outcomes of Red Spartan athletes when group according to profile?

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5. Was there a significant difference on the influence of volleyball training regimen when group according to profile?

6. Was there a significant relationship between structured volleyball training program in the physical performance outcomes and its influence on the tactical skill development Red Spartan athletes?

7. Based on the findings of the study, what development program might have been proposed to enhance the training program among male and female athletes?

Hypotheses

The researcher tested the following null hypothesis:

1. There was no significant difference on the effect of structured volleyball training program at Batangas State University in the physical performance outcomes of Red Spartan athletes when group according to profile.

2. There was no significant difference on the influence of volleyball training regimen when group according to profile.

3. There was no significant relationship between structured volleyball training program in the physical performance outcomes and its influence on the tactical skill development Red Spartan athletes.

METHODS

Research Design

The study employed a comparative research design. This design was considered appropriate because the study sought to examine and compare the reported outcomes of a common volleyball training program between two groups—male and female Red Spartan athletes. The analysis focused on physical performance and tactical development and examined whether the athletes differed in their responses to the organized training environment.

Respondents of the Study

The respondents consisted of 54 male and female volleyball players of Batangas State University who directly participated in the volleyball training program. The sample included 28 male athletes (51.85%) and 26 female athletes (48.15%). Participants were required to be active volleyball athletes with direct exposure to the training activities under investigation.

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Sampling Technique

Total enumeration was employed because the number of qualified volleyball athletes was manageable. All eligible members of the identified population were included, allowing the researcher to obtain information from the entire accessible group rather than selecting only a sample.

Research Instrument

The primary instrument was a researcher-developed, self-administered questionnaire using a four-point Likert scale. The quantitative component covered the respondents' demographic profile, the perceived influence of the structured volleyball training program on physical performance outcomes, tactical skill development, and tactical comprehension/game awareness. A qualitative component was also incorporated to capture athletes' experiences and perceptions regarding the training activities.

Validation and Reliability

The instrument underwent expert evaluation to establish content validity in terms of relevance, clarity, and appropriateness of the items. The dissertation also reports the use of Cronbach's alpha to examine internal consistency reliability.

Data Gathering Procedure

The researcher secured the necessary institutional permission before collecting data. Respondents were informed of the purpose and procedures of the study and participated voluntarily. Informed consent was obtained, and the researcher observed confidentiality, anonymity, secure handling of electronic records, and protection of participants from unnecessary physical, psychological, or emotional harm.

Data Analysis

Weighted mean and standard deviation were used to summarize respondents' assessments. The Kruskal–Wallis H test was used to determine differences among age groups, while the Mann–Whitney U test was used to compare male and female athletes. Spearman rank-order correlation was used to determine the strength and direction of relationships between physical performance and tactical outcomes.

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For interpretation of the four-point scale, higher ratings represented stronger perceived influence/effectiveness of the training program. Inferential decisions were evaluated at the 0.05 level of significance.

RESULTS

The findings of the study are presented below in an itemized and elaborated form for clearer interpretation.

1. Demographic Profile

Table 1

Frequency and Percentage Distribution of Respondents' Profile

Profile	Frequency	Percentage
18 years and below	8	14.81%
19–21 years	36	66.67%
22–24 years	6	11.11%
25 years and above	4	7.41%
Male	28	51.85%
Female	26	48.15%
Total	54	100.00%

Table 1 shows that the largest proportion of Red Spartan volleyball athletes were 19–21 years old, comprising 66.67% of the respondents. This was followed by athletes aged 18 years and below at 14.81%, those aged 22–24 years at 11.11%, and those aged 25 years and above at 7.41%. The sex distribution was relatively balanced, with 28 male athletes (51.85%) and 26 female athletes (48.15%). The near-equal representation of male and female athletes provides a useful basis for comparing their reported experiences and outcomes.

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2. Physical Performance Outcomes

Table 2

Selected Mean and Standard Deviation of the Reported Influence of the Volleyball Training Program on Physical Performance

Physical performance indicator	Male M (SD)	Female M (SD)	Interpretation / finding
Vertical jump height improvement	3.75 (0.44)	3.46 (0.51)	Favorable
Perceived improvement in jumping ability	3.64 (0.49)	—	Favorable
Reaction time before vertical jump	—	3.65 (0.49)	Favorable
Hang time	2.46 (1.00)	2.38 (0.64)	Lower-rated area
Movement efficiency during gameplay	—	3.58 (0.50)	Favorable
Coach-observed responsiveness during transitions	—	3.62 (0.57)	Favorable
Illinois Agility Test improvement	—	2.42 (0.58)	Lower-rated area
Blocking and spiking force	3.54 (0.58)	3.46 (0.71)	Favorable
Physical exertion/recovery	3.61 (0.57)	3.38 (0.70)	Favorable
One-minute push-up performance	2.43 (0.50)	2.35 (0.69)	Lower-rated area

Table 2 indicates generally favorable perceived outcomes in the physical domain. Male athletes reported strong improvement in vertical-jump height (M = 3.75, SD = 0.44) and perceived jumping ability (M = 3.64, SD = 0.49), while female athletes reported favorable improvement in jump height (M = 3.46, SD = 0.51) and reaction time before the jump (M = 3.65, SD = 0.49). Hang time was rated comparatively lower by both groups, suggesting that the program may have produced more noticeable gains in take-off performance than in sustained time in the air.

In agility, female athletes rated movement efficiency during gameplay (M = 3.58, SD = 0.50) and coach-observed responsiveness during transitions (M = 3.62, SD = 0.57) favorably. However, improvement in the Illinois Agility Test was comparatively low (M = 2.42, SD = 0.58). This

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suggests that sport-specific movement may have improved without a corresponding perceived improvement in a standardized agility course.

For strength, both male and female athletes reported favorable improvement in volleyball-specific blocking and spiking force. Male athletes obtained M = 3.54 (SD = 0.58), while female athletes obtained M = 3.46 (SD = 0.71). However, one-minute push-up performance received low ratings from both groups, with M = 2.43 (SD = 0.50) among males and M = 2.35 (SD = 0.69) among females. The results suggest that the program may be stronger in developing explosive, sport-specific force than repetitive upper-body muscular endurance.

3. Tactical Skill Development

Table 3

Mean and Standard Deviation of the Reported Influence of the Volleyball Training Program on Tactical Skill Development

Tactical indicator	Male M (SD)	Female M (SD)	Interpretation
Following tactical instructions before/during matches	3.64 (0.49)	—	Highly influential
Self-assessed spatial awareness during play	3.64 (0.49)	3.58 (0.50)	Highly influential
Recognition of offensive/defensive formations in real time	2.39 (0.50)	—	Lower-rated area
Response time shifting offense ↔ defense	—	3.54 (0.51)	Highly influential
Awareness of teammates' locations and roles	—	2.42 (0.70)	Lower-rated area
Adjustment of strategies based on opponent behavior	3.64 (0.49)	—	Highly influential
Coach-rated decision-making in competition	3.54 (0.58)	2.38 (0.70)	Different perceptions
Selection of appropriate plays under pressure	2.43 (0.50)	—	Lower-rated area
Accuracy of in-game decisions	—	3.58 (0.50)	Highly influential
Frequency of unforced tactical errors	—	3.58 (0.50)	Highly influential

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Table 3 shows that game awareness was generally perceived as highly influential. Male athletes rated following tactical instructions and spatial awareness at M = 3.64 (SD = 0.49), while female athletes rated spatial awareness at M = 3.58 (SD = 0.50) and response time during offensive–defensive transitions at M = 3.54 (SD = 0.51). Lower ratings were observed for real-time recognition of offensive and defensive formations among males (M = 2.39, SD = 0.50) and awareness of teammates' locations and roles among females (M = 2.42, SD = 0.70).

For decision-making, male athletes rated adjustment of strategies based on opponent behavior highest (M = 3.64, SD = 0.49), followed by coach-rated decision-making quality in competitive situations (M = 3.54, SD = 0.58). Their lowest rating concerned selecting appropriate plays under pressure (M = 2.43, SD = 0.50). Female athletes rated accuracy of in-game decisions and the frequency of unforced tactical errors at M = 3.58 (SD = 0.50), whereas coach-rated decision-making quality was lower at M = 2.38 (SD = 0.70).

4. Significant Differences in Physical Performance Outcomes

Table 4

Kruskal–Wallis H and Mann–Whitney U Tests of Differences in Physical Performance Outcomes

Variable	Age-group comparison	Sex comparison	Decision
Strength	H = 23.74, p < .001	U = 24.00, p < .001	Significant
Agility	H = 22.98, p < .001	U = 0.00, p < .001	Significant
Vertical jump	H = 27.73, p < .001	U = 33.00, p < .001	Significant

Table 4 demonstrates significant differences in all three physical-performance outcomes when athletes were grouped by age. Strength, agility, and vertical jump all yielded p-values below .001. Mean ranks increased across the older age groups, with athletes aged 22–24 and 25 years and above obtaining the highest ranks.

The Mann–Whitney U results likewise showed significant differences between male and female athletes in strength (U = 24.00, p < .001), agility (U = 0.00, p < .001), and vertical jump (U = 33.00, p < .001). Female athletes obtained higher mean ranks in the reported comparisons. These results indicate that athlete profile should be considered when evaluating and adjusting the training program.

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5. Significant Differences in Tactical Skill Development

Table 5

Kruskal–Wallis H and Mann–Whitney U Tests of Differences in Tactical Skill Development

Variable	Age-group comparison	Sex comparison	Decision
Game awareness	H = 22.98, p < .001	U = 0.00, p < .001	Significant
Decision-making	H = 21.53, p < .001	U = 0.00, p < .001	Significant

Table 5 shows statistically significant age-group differences in game awareness (H = 22.98, p < .001) and decision-making (H = 21.53, p < .001). Mean ranks increased with age, with older athletes obtaining higher ranks. Significant male–female differences were also found in both game awareness and decision-making (U = 0.00, p < .001), with female athletes obtaining higher mean ranks.

6. Relationships Between Physical Performance and Tactical Skills

Table 6

Spearman Correlations Between Physical Performance and Tactical Indicators

Physical indicator	Game awareness (r_s)	Decision-making (r_s)
Strength	.943	—
Agility	1.000	.894
Vertical jump	.904	.894

Table 6 indicates strong positive relationships between physical and tactical outcomes. Strength, agility, and vertical jump were strongly and positively associated with game awareness, with coefficients of .943, 1.000, and .904, respectively. Agility and vertical jump were also strongly associated with decision-making (r_s = .894). These results indicate that athletes who reported stronger physical development also tended to report stronger tactical development.

The correlation findings should be interpreted as associations rather than proof that improvement in one domain causes improvement in another. Because the study used a comparative design and relied substantially on reported/perceived outcomes, causal conclusions should not be drawn from the correlation coefficients alone.

DISCUSSION

The discussion of the findings is presented in an expanded and itemized form to clearly explain the implications, interpretations, and theoretical grounding of the results.

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1. Profile of the Red Spartan Athletes

The predominance of athletes aged 19–21 years reflects the typical composition of collegiate student-athletes. The relatively balanced distribution of male and female respondents is particularly valuable because it allows the training program to be examined across two groups within the same institutional setting. However, age distribution should be treated as descriptive rather than as evidence that the program is inherently more effective for one age group. Differences may also reflect training history, competitive exposure, physical maturity, playing position, and accumulated experience.

2. Physical Performance

The favorable results for vertical jump and volleyball-specific strength suggest that structured and repeated training activities can support explosive performance. The stronger ratings for blocking and spiking force compared with push-up performance indicate that the program may be particularly aligned with sport-specific power rather than general upper-body muscular endurance. This distinction is important in program design because volleyball performance requires both explosive force and the capacity to repeatedly execute actions throughout a match.

The lower rating for hang time is also meaningful. Vertical-jump height and hang time are related but distinct characteristics. An athlete may improve take-off power and reach a greater height without necessarily producing a large increase in the duration of flight. The result therefore supports continued refinement of jump mechanics, plyometric progression, landing mechanics, and strength development rather than interpreting the lower hang-time rating as evidence that jump training was ineffective.

The agility findings further demonstrate the importance of sport specificity. Female athletes reported favorable movement efficiency and transition responsiveness, yet the Illinois Agility Test received a lower rating. Volleyball movements are reactive and context-dependent, whereas standardized agility tests follow predetermined movement patterns. Training should therefore assess both sport-specific agility and standardized agility to provide a more complete picture of athlete development.

3. Tactical Development

The results show that tactical development was a major component of the perceived training influence. Male athletes demonstrated strong ratings for following tactical instructions and spatial awareness, but real-time formation recognition was comparatively weak. Female athletes demonstrated strong spatial awareness and transition responsiveness, while awareness of teammates' locations and roles was comparatively lower. These findings suggest that coaches should create situations in which athletes must interpret changing formations, communicate, anticipate opponents, and adjust positioning rather than simply reproduce predetermined movements.

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4. Decision-Making

The male athletes' strength in adjusting strategies according to opponent behavior suggests an ability to adapt to changing match conditions. However, their lower rating for selecting appropriate plays under pressure identifies a possible need for more decision-making drills involving realistic offensive choices. Female athletes reported strong accuracy and avoidance of tactical errors, yet the lower coach-rated decision-making score suggests a possible difference between athletes' self-perceptions and coaches' broader tactical evaluations. Regular feedback, video review, and coach–athlete debriefing may help align these perspectives.

5. Age and Sex Differences

The significant age-group differences across physical and tactical outcomes suggest that developmental stage and accumulated experience may be important considerations in training design. Older athletes obtained higher mean ranks in the reported analyses, which may reflect greater exposure to training and competition as well as physical and tactical development. The significant sex differences should not be interpreted as evidence of fixed superiority. Rather, they indicate that the same training environment may produce different reported outcomes and therefore justify more individualized monitoring and programming.

6. Physical–Tactical Relationship

The strong correlations between physical and tactical indicators support the principle that physical and cognitive-tactical development should be trained together. Volleyball athletes must perceive a game situation, move into an appropriate position, and execute a skill or tactical response in a very short time. Integrated drills that combine physical constraints with perception and decision-making demands may therefore be particularly appropriate. This interpretation is consistent with the Constraint-Led Approach, which emphasizes representative task environments and adaptation to changing constraints.

7. Implications for Gender-Responsive Training

The findings support a gender-responsive approach not because male and female athletes should receive completely separate programs, but because coaches should recognize differences in needs, responses, and areas for development. A common training framework can be retained while allowing individual or group-specific modifications in load, progression, tactical emphasis, feedback, and recovery. Such an approach is more consistent with athlete-centered development than assuming that identical training inputs will produce identical outcomes.

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PROPOSED HOLISTIC DEVELOPMENT PROGRAM FOR RED SPARTAN VOLLEYBALL EXCELLENCE

The proposed program is based on the study's findings that age, sex, physical performance, and tactical development are interconnected. The program is designed to strengthen the identified areas of need while retaining the successful components of the existing training environment.

Table 7

Proposed Holistic Development Program for Red Spartan Volleyball Excellence

Key Result Area	Program / Activity	Objective	Persons Involved	Time Frame	Expected Outcome
Vertical Jump / Explosive Power	Progressive plyometrics, jump mechanics, landing drills	Increase explosive lower-body power and jump efficiency	Head/Assistant Coaches, Strength & Conditioning Personnel	Every training cycle	Improved jump performance and safer landing
Agility / Movement	Reactive agility, acceleration/deceleration, change-of-direction drills	Improve sport-specific movement and standardized agility	Coaches, Athletes	Weekly	Improved court coverage and responsiveness
Strength / Endurance	Volleyball-specific resistance training plus upper-body endurance circuits	Develop explosive force and address low push-up performance	Coaches, Strength & Conditioning Personnel	2–3 sessions/week as programmed	Balanced strength and endurance profile
Game Awareness	Small-sided games, formation-recognition drills, scenario-based play	Improve spatial awareness and real-time tactical recognition	Coaches, Athletes	Weekly	Faster recognition of game situations
Decision-Making	Pressure drills, quick-set/high-set scenarios, constrained games	Improve tactical choices under time and	Coaches, Athletes	Weekly	More accurate and adaptable decisions

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		competitive pressure			
Communication	Role clarification, court-coverage calls, peer feedback	Strengthen coordination and awareness of teammates' roles	Coaches, Team Leaders, Athletes	Weekly	Improved communication and teamwork
Monitoring and Evaluation	Periodic physical and tactical assessment; athlete feedback	Track progress and individualize training	Coaches, Sports Staff	Pre-, mid-, and post-cycle	Evidence-based adjustment of training

Table 7 presents a program that combines physical conditioning, tactical development, communication, and continuous monitoring. The design responds directly to the weaker indicators identified in the study, particularly hang time, standardized agility, upper-body muscular endurance, formation recognition, teammate-role awareness, and decision-making under pressure. The program also allows differentiated progression according to age, experience, and individual athlete needs.

CONCLUSIONS

The following conclusions were reached in light of the finding's summary:

1. The concentration of athletes between the ages of 19 and 21, with a slightly higher number of males, occurred due to the university's recruitment and team selection processes, which often draw from undergraduate students within this age range. This demographic trend reflects the typical composition of collegiate sports teams.

2. Improvements in vertical jump height and self-perceived progress among males resulted from targeted plyometric and jump training, while limited gains in hang time may be attributed to the complexity of enhancing this specific skill. Female athletes' strong reaction times and jump improvements, coupled with overall positive training responses, highlight the effectiveness of tailored drills, although both groups' minimal progress in push-ups suggests a need for diversified strength routines and additional emphasis on upper body endurance.

3. Male athletes' strong game awareness in following instructions and spatial perception stemmed from focused tactical practices and scenario-based drills, whereas their difficulties with real-time formation recognition point to a need for more in-game simulation exercises. Female athletes' proficiency in spatial awareness and quick transitions reflects effective movement and tactical training, but gaps in understanding teammates' roles and lower coach ratings in decision-making suggest areas where communication and situational practice could be enhanced.

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4. Significant differences in physical performance across age groups, with older athletes achieving higher scores, likely resulted from accumulated experience and more advanced skill development over time. The consistent outperformance of females in physical tests may be attributed to their adherence to training protocols and higher baseline motivation levels, as measured by standardized physical assessments.

5. Statistical differences in game awareness and decision-making across age groups were observed because older athletes have had more opportunities for cognitive and experiential learning during competition. Female athletes' stronger cognitive performance in these areas can be linked to their engagement in strategic drills and responsiveness to feedback, as shown in evaluation scores.

6. The strong correlations between cognitive skills (game awareness, decision-making) and physical performance arose because strategic thinking and on-court awareness directly influence an athlete's ability to execute physical tasks. This relationship was established through statistical analysis, which consistently showed that improvements in tactical and decision-making skills were mirrored by gains in physical abilities.

7. The holistic development program's significance is rooted in its evidence-based, multifaceted approach, which was crafted to address specific gaps revealed by both quantitative and qualitative findings. Its design ensures that interventions are responsive to the actual needs of male and female athletes, fostering balanced improvement in both physical and cognitive domains for long-term team success.

RECOMMENDATIONS

The following recommendations were made in light of the conclusions reached:

1. Coaches may diversify their recruitment strategies to ensure a well-balanced team in terms of age and gender, including actively scouting younger prospects who can contribute to the program's long-term success. Athletes are encouraged to embrace mentorship roles, supporting and guiding their younger teammates to create an inclusive and unified team culture. School administrators can further support this goal by establishing targeted scholarships and implementing talent search initiatives that attract a broad and diverse pool of student-athletes, ensuring a healthy composition of the team for years to come.

2. Coaches may refine training regimens by incorporating more targeted plyometric routines to improve vertical jump height and including exercises specifically designed to enhance hang time and upper body strength, such as progressive push-up variations. Athletes may commit to individualized strength and conditioning programs, actively seeking feedback to address areas where progress is limited and striving for continuous improvement in all aspects of their physical development. School administrators play a vital role by investing in up-to-date training

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equipment and ensuring athletes have access to certified strength and conditioning specialists, thus supporting a holistic approach to athletic training.

3. To enhance game awareness and decision-making, coaches may integrate more in-game simulations and tactical scenarios into practice sessions, offering athletes realistic opportunities to develop real-time decision-making skills and improve formation recognition. Athletes, in turn, may take an active role in tactical discussions, regularly reviewing game footage to better comprehend formations and the roles of their teammates. School administrators can augment these efforts by organizing workshops and clinics focused on sports psychology and tactical awareness, as well as promoting cross-training sessions with other teams to broaden athletes' strategic perspectives.

4. Coaches may need to tailor training programs to match the intensity and complexity required by athletes' age and experience levels, recognizing the importance of individualized approaches, especially for younger or less experienced team members. Athletes are encouraged to establish age-appropriate progression goals and actively support one another, helping maintain motivation and adherence to training routines. At the administrative level, it is recommended to allocate resources equitably and consider organizing age-group tournaments or development camps to ensure every athlete has the opportunity for continuous growth and improvement.

5. Coaches may create an environment that fosters the sharing of experiences and strategies across different age groups, accelerating cognitive development for all athletes. Athletes can benefit from engaging in reflective practices and peer-led sessions where valuable insights on in-game decisions are exchanged. School administrators may support this by ensuring that coaches have access to ongoing education in cognitive training techniques and by integrating leadership development programs into the overall athletic curriculum.

6. Coaches may combine cognitive drills such as split-second decision-making tasks with physical training routines to simultaneously strengthen both mental and physical competencies. Athletes may take advantage of techniques like mindfulness and visualization to enhance their focus and on-court awareness, directly benefiting their physical execution. Administrators can drive innovation by funding research or pilot programs that explore integrated training methods, paving the way for more effective and holistic athlete development.

7. Coaches are called upon to champion the holistic development program, ensuring that evidence-based practices are consistently and effectively applied to meet individual and team needs. Athletes may fully engage with all elements of the program, remaining open to both physical and cognitive growth opportunities provided. School administrators play a crucial role in sustaining the program's momentum by providing ongoing funding, conducting regular assessments, and recognizing the achievements of coaches and athletes, thereby maintaining high levels of enthusiasm and commitment within the team.

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LIMITATIONS OF THE STUDY

The study was limited to 54 volleyball athletes from Batangas State University and therefore may not be generalized to collegiate volleyball athletes in other institutions. The comparative design identifies differences and relationships but does not establish causal effects of the training program. Several outcomes were based on athletes' reported perceptions, supplemented in some cases by coach observations. Consequently, the findings should be interpreted as evidence of perceived influence and association rather than definitive experimental effects. Future research using objective performance testing and longitudinal designs is recommended.

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The references below represent the principal works cited or discussed in the dissertation and should be reconciled with the final approved reference list before journal submission.

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