

Impact of Volleyball Course on College Students' Tactical Skills in China

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Abstract: In 1910, the game of volleyball was introduced in China. Currently, the level of Chinese competitive volleyball is relatively high, and it has achieved good results in international tournaments so it is timely and necessary to investigate its teaching in universities and colleges. The effects of playing volleyball may influence the students' safety, physical conditioning, use of facilities, team considerations, experience with the coach or instructor, and tactical ability. Much has been studied in the field of volleyball including its health effects on its players. However, there was a dearth of literature on the effects of volleyball courses on university students in China. Thus, the study looked into this area of investigation to propose a teaching development for volleyball courses in universities and colleges in China. Using descriptive comparative correlational research design, the findings revealed that the majority of the participants were male first-year college students pursuing engineering studies. The college students evaluated the impact of their tactical skills in playing volleyball. The factors of safety and instructor received the highest assessment while the management of equipment and facilities had the lowest assessment. There was a significant difference in the assessment of the management of equipment and facilities domain based on the respondents' year levels, with a small effect size. On the other hand, no significant difference was found in safety, physical conditioning, team consideration, instructor, and overall experience of college students in playing volleyball. Comparing the groups, 1st and 2nd year students scored higher in management of equipment and facilities than those 3rd year students. Overall, the college students were assessed to have average tactical skills in playing volleyball. Specifically, offensive tactical skills scored higher than defensive tactical skills.

Keywords: College Students; Volleyball Courses in China; Tactical Skills in Playing Volleyball.

1. INTRODUCTION

Volleyball is one of the most popular sports played in school, communities, and some countries in the world namely Brazil, United States, Russia, and Poland. As it was invented in 1895, it was designed as an indoor sport for businessmen who were too vigorous for basketball then. Now, it is enjoyed by people around the world as an outdoor, indoor or even beach game because it can be played on a number of different surfaces, with team sizes ranging from two to six players.

Volleyball originated in the United States and was introduced into Europe by American troops during World War I. International volleyball competition began in 1913 with the first Far East Games, in Manila, Philippines. In Asia, it was being played then during the early 1900s and continuing until after World War II by nine players on a team on a larger court with a lower net. It became an official Olympic sport for both men and women in 1964 at the Tokyo Olympic Games (Britannica, 2024).

Like any sport, volleyball is good for the health, both in mind and body. Physically, the use of upper body in playing volleyball, especially the arms, shoulder, thigh and lower legs, is strengthened. Also, it can improve hand-eye coordination and fast reflexes. This active sport can tone and boost cardiovascular and respiratory systems. Regular playing of volleyball may improve blood circulation, oxygen, and nutrients into the body as well as enhance one's energy levels for overall well-being. It is a great way to burn calories up to 585 calories playing for forty-five minutes (Center for Professional Recovery, 2018).

1.1. Volleyball as School Sports

Volleyball rules were issued in 1916 by Young Men's

Christian Association (YMCA) and the National Collegiate Athletic Association (NCAA). Its first United States tournament was in 1922 conducted by the National YMCA Physical Education Committee in New York City. Then, the United States Volleyball Association (USVBA) was formed in 1928 and recognized as the rules-making, governing body in the United States. Since then, annual national men's and senior men's (age 35 and older) volleyball championships, except while the women's division started in 1949, and a senior women's division (age 30 and older) was added in 1977.

Volleyball is a good training and discipline among young children in elementary schools. They learn a number of skills through a play approach in volleyball. In Indonesia, a study was conducted among primary school students playing volleyball according to the plan and the learning method. Based on the results of this study, the play approach improved the learning outcomes of students who received the skills from playing the volleyball game (Hambali & Sutiswo, 2020).

In Brazil, despite the popularity of volleyball, it is taught in school in a traditional approach in Physical Education classes. Thus, the students' difficulties in practicing volleyball in PE classes were investigated to understand the tactical principles of the sport, and to compare them with teachers' understanding of the discipline. Through qualitative research, the identified difficulties were building the attack, occupying spaces on the court, looking for empty spaces, intending to contact the ball, and directing serves. Whereas the teachers' view, the difficulties in serves were indicated as students' main problem and, on the other hand, occupying court spaces as the action they performed more easily. As a result, it was concluded that there were differences between the students' and the teachers' views which could possibly related to teachers' traditional training and experiences that were not

focused on the teaching of tactical principles (Parente et al., 2020).

1.2. Background of the Study

In 1910, the game volleyball was introduced in China by Max Exner and Crokner which was played by 16 men in a team for a 21-point game in 1917 (NCVA, 2024). However, development of volleyball in China was relatively slower because of some historical conditions and mainly it lacked recognition from the masses (Yang et al., 2017).

Then, in 1953, the China Volleyball Association was founded which paved way for China to join the International Volleyball Federation (FIVA) the following year. In 1956, China qualified in the World Championships for the first time so the volleyball athlete skill level standard was formulated, which greatly promoted the standardized development of Chinese volleyball.

In the 1980s, China's women volleyball team won five straight in three major volleyball events. Inspired by women's volleyball spirit, China started the road of volleyball professionalism reform and established the Chinese Volleyball League in 1996. The Chinese women's volleyball team won a gold medal again at the 2004 Olympics and 2016 Olympics. For more than 10 years, it has been a period of ups and downs for the Chinese volleyball team. In 2016, the women's volleyball reached the top again, which increased the commercial value of women's volleyball greatly. In 2017, conforming to the Volleyball Craze in China, the Chinese Volleyball League was updated to the Chinese Super League (Tingyu, 2021).

Despite these, studies on Chinese volleyball system and development were mostly in the declining tendency. Chinese sports journals published relative volleyball scientific papers which presented Chinese volleyball development as not going well (Yang et al., 2017). The period of ups and downs for the Chinese volleyball after 2004 Olympics was brought about by ineffective development of the volleyball in colleges and universities. It was investigated and analyzed that the development of volleyball teaching and extracurricular activities in regular colleges and universities involved difficulties. Likewise, to provide reference for improving the quality of volleyball teaching in colleges and universities, it needed theoretical foundations for the Department of Education and the Department of Sports to formulate the relevant policies (Hu et al., 2014).

In tertiary education, physical education courses have also become indispensable courses, especially the teaching of volleyball courses. This course is a leader affecting the unity and cooperation of students and develops a sense of competition for them to strive and enterprise. Aside from the expected improvement in the physical condition of students, volleyball course may cultivate a hard-working spirit among them (Dong & Wang, 2021).

Since the achievement of China's women volleyball team, most of the female university students have positive recognition towards the value of playing volleyball. After the students exercised when playing volleyball and trained for eight weeks, their respiratory systems and health greatly improved including their mental health (Wu, 2013). Likewise, college students (both male and female) were superior in the physical fitness tests which demonstrated that both interventions (controlled and uncontrolled) in volleyball resulted in good conditioning. Volleyball training positively impacted college students' physical fitness and

cardiopulmonary endurance. It also increased the students' interest in the sport, optimizing the college students' physical quality and improving their cardiopulmonary resistance (Yue & Hong, 2023).

However, these outcomes are impeded by the conservative pedagogy of volleyball courses which does not fully attract students' interest and performance. After analyzing the literature, realistic dilemmas faced by college volleyball teaching were determined. Thus, to increase the popularity of volleyball and change the teaching situation, improved methods of volleyball teaching and playing a good role in actual education were recommended (Dong & Wang, 2021). Moreover, the procedural way of traditional teaching makes the students' mobility and creativity development space is relatively small, and it is difficult for students to achieve personalized development when they practice volleyball in the traditional teaching mode. The frequency of communication and interaction between teachers and students is also relatively lower (Jiao, 2023).

In addition, based on some teachers' observations, the basic skill of volleyball training is the key issue particularly the tactical ability of players. Hence, analyzing the key issues of modern volleyball athletic training from the physical training, technical training, tactical ability, psychological, and moral quality will help popularize and improve the volleyball sport in colleges and universities, and provide reference basis for the healthy development of the college volleyball team (Li et al., 2016).

1.3. Statement of the Problem

The study determined the effects of volleyball courses on university students in China.

Specifically, this study answered the following questions:

1. What is the profile of the college students based on their:

1.1 sex

1.2 year level

1.3 course

2. What is the impact of the college students' tactical skills in playing volleyball in terms of:

2.1 Safety

2.2 Physical conditioning

2.3 Management of equipment and facilities

2.4 Team consideration

2.5 Instructor

3. Is there a significant difference in the assessment of the respondents on the impact of college students' tactical skills in playing volleyball when they are grouped according to profile?

4. What is the assessment of the tactical skills of college students in playing volleyball in terms of:

4.1 Offensive skill

4.2 Defensive skill

5. Is there a significant relationship between the impact of college students' tactical skills and their assessment of their tactical skills in playing volleyball?

6. Based on the results of the study, what teaching development in college volleyball courses can be designed?

Hypotheses:

1. There was no significant difference in the impact of the college students' tactical skills in playing volleyball when they are grouped according to profile.

2. There was no significant difference between the impact of the college students' tactical skills in playing volleyball and their tactical skills in playing volleyball.

1.4. Significance of the Study

The proposed study focused on the effects of volleyball on college students, but its output will be beneficial to the following groups of individuals:

College Students. They are the direct beneficiaries of this study. It will provide them with clear evidence of the effects of the volleyball course specifically on their safety, physical conditioning, management of equipment and facilities, team consideration, experience with their instructor, and tactical skills.

Physical Education Teachers. They will directly benefit from the study since the research output is aimed at their teaching development of volleyball. Moreover, they can refer to the study to understand their students' perception of their safety, physical conditioning, management of equipment and facilities, team consideration, experience with their instructor, and tactical skills.

Volleyball Coaches. Similar to PE teachers, they can refer to the findings and output of the study to improve their pedagogy in teaching volleyball effectively and address the tactical difficulty of their students.

Volleyball Instructors. Insights from the study can help instructors refine their teaching methods and course structures, ensuring that they effectively enhance students' tactical understanding and skills in volleyball.

Higher Education Institutions. The results of the study can be their reference to enhance not only their teachers teaching development but also their equipment and facilities for volleyball courses which may result in higher promotion and enrollment of volleyball in the universities and colleges.

Scholars and Researchers. Scholars in the disciplines of sports education and volleyball might consider the limitations and recommendations of the study to further investigate these variables for better teaching and learning of volleyball.

1.5. Scope and Delimitation

This study explored the impact of volleyball courses on college students' tactical skills in China. It will cover the demographic characteristics of the college students in China specifically their sex, age, and course. Specifically, the college students evaluated the impact of their tactical skills in playing volleyball in terms of safety, physical conditioning, management of equipment and facilities, team consideration, and experience with their volleyball instructor. Then, the study looked into the disparities, if there were any, in the college students' evaluations based on their respective profiles.

Moreover, the college students assessed the tactical skills, such as offensive and defensive skills, they employ in the volleyball course. Then, the study examined the difference between the impact of the college students' tactical skills and their assessment of their tactical skills in playing volleyball as additional input in the teaching development of volleyball instructors in colleges and universities. The findings of the study were the basis for the teaching development of volleyball instructors in colleges and universities.

On the other hand, the limitations of the study were anticipated which may affect the results of the study. First, the research locale consisted of five universities namely Guangxi Normal University, Guangxi Minzu University, Guilin University Of Electronic Technology, Guilin University of Technology, and Beibu Gulf University, which may provide limited assessments on their volleyball instructors and may restrict the generalizability of findings to other institutional

contexts.

Second, the research instrument to assess the effects of volleyball courses on college students was adopted from an athletic survey by the Junior Volleyball Association (n.d.) may provide a limited evaluation of the impact of college students' tactical skills in playing volleyball. Likewise, the college students' assessment might be limited within the coverage of the provided adopted survey tools.

Lastly, the interpretations of the study may be subjected to possible bias which may influence the college students' responses, so introducing possible mistakes in their assessments of volleyball course and tactical skills. In addition, the limited sample size may not provide sufficient generalizability of findings. Due to the inherent subjectivity in the evaluation of the effects of volleyball courses, the diverse interpretations across the demographics of college students may lead to variations in response consistency.

1.6. Theoretical Framework

The study is focused on the effects of volleyball on college students and they are commonly motivated to engage in sports activities, especially the popular game volleyball. Hence, this study is anchored on self-determination theory (SDT). It is a broad theory of human personality and motivation concerned with how the individual interacts with and depends on the social environment. SDT defines intrinsic and several types of extrinsic motivation and outlines how these motivations influence situational responses in different domains, as well as social and cognitive development and personality. SDT is centered on the basic psychological needs of autonomy, competence, and relatedness and their necessary role in self-determined motivation, well-being, and growth. Finally, SDT describes the critical impact of the social and cultural context in either facilitating or thwarting people's basic psychological needs, perceived sense of self-direction, performance, and well-being (Legault, 2017).

SDT has direct relevance to sports courses offered to students who may have different variance of motivation to engage in physical education. This variance in motivation has implications for the efficacy of successful sports learning goals known as self-determined motivation. It is generally defined as "the innate energy that people demonstrate when they pursue a goal or an activity because it is enjoyable." SDT conceptualizations of motivation focus mainly on controlled and autonomous reasons for behavioral engagement (Langdon et al., 2014).

The major proponents of SDT are Ryan and Deci (2017) who established its three basic psychological needs: autonomy, competence, and relatedness. Like physical needs, these needs are said to be objective phenomena in that their deprivation or satisfaction has clear and measurable functional effects, effects that obtain regardless of one's subjective goals or values.

The elements of SDT were found relevant to the study since playing volleyball entails autonomy, competence, and relatedness. College students' familiarity and attractiveness to volleyball courses are motivated by autonomy; it is their preference to play volleyball among other sports in their physical education program. Each time they play volleyball, they employ competence if not to win at least to perform their best in the game. Being part of a team is related to being able to contribute to the team.

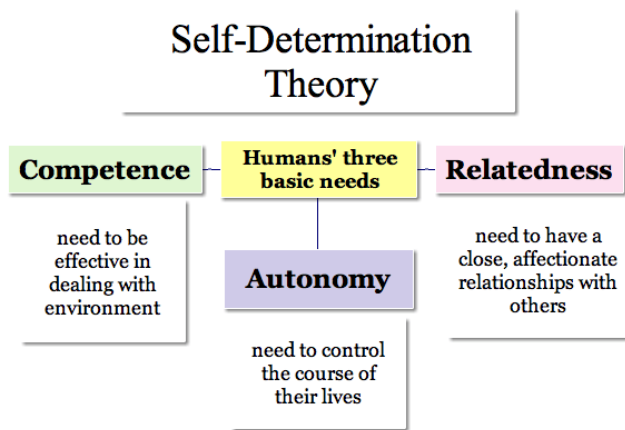


Fig 1. Self-Determination Theory by Ryan and Deci (2017)

1.7. Research Paradigm

The study examined the impact of college students' volleyball tactical skills in China as the basis for teaching development in universities and colleges following the research paradigm in Figure 2. To realize this, the demographic characteristics of the college students as respondents of the study were described with a focus on their gender, age, and course.

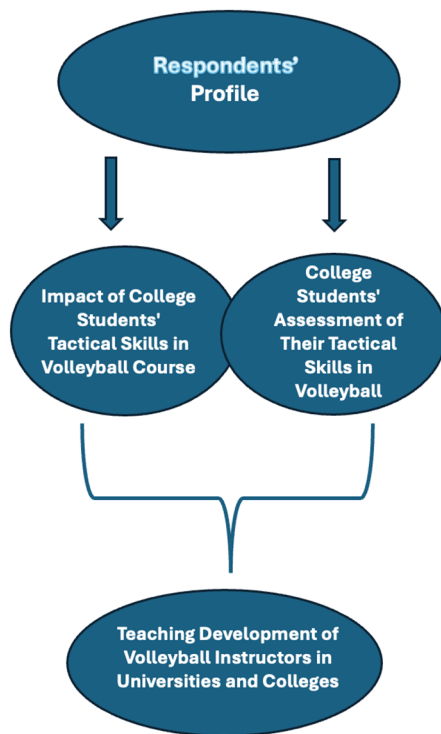


Fig 2. Research Paradigm

Then, the college students evaluated the perspectives of the volleyball course such as safety, physical conditioning, management of equipment and facilities, team consideration, and experience with their volleyball instructor. For deeper examination, the study will look into significant inequalities, if there is any, in the college students' evaluation of the impact of their tactical skills in playing volleyball based on their respective profiles.

Then, the college students assessed their tactical skills in terms of their defense and offense capabilities. To provide an additional explanation of the effects, the interdependence between their tactical skills and the impact of their tactical skills in the volleyball course will be analyzed.

With the available data, the proposed study was able to design the teaching development for volleyball instructors in universities and colleges. Through the research output, higher education institutions had a reference to enhance not only their teacher's teaching development, but also their equipment and facilities for volleyball courses which may result in higher promotion and enrollment of volleyball in the universities and colleges.

2. METHODOLOGY

This section presents the methods to be used in the proposed study specifically the research design, sampling technique including proposed respondents of the study, an instrument to be used, process of data collection, statistical tools to be used, and ethical considerations.

2.1. Research Design

The study investigated the impact of college students' tactical skills in volleyball as a basis for the teaching development of volleyball instructors in tertiary education. To achieve this purpose and answer the research question, the study used descriptive comparative correlational research design. This is a quantitative approach that involves statistical analysis and thorough descriptions to provide valid answers to the research problem.

First, the descriptive approach aims to describe an existing phenomenon and its relation between the other variables in a study. The quantitative descriptive approach observed no interference or manipulation of the responses. The independent variable in the proposed study is the volleyball course while the dependent variable is its effects on college students. This approach provided descriptions of the demographics of college students in China which may affect their evaluation of the volleyball course in their university.

While the comparative approach in quantitative research examines a variable in the study in relation to another variable. The study was applied to investigate the patterns of similarities and differences between evaluating college students on the volleyball course, considering their demographic characteristics. Moreover, this method helped compare college students' evaluations, experiences, and behaviors across their sex, age, and courses.

Then, the correlational approach measured two variables in the study to assess their difference without manipulating or controlling them. In this study, the correlational approach analyzed the relationship between the impact of college students' tactical skills and their assessment of their tactical skills in the volleyball course. This method provided distinct or indistinct differences of these two variables which can contribute to the impact of tactical skills on them as players of the game.

Overall, the descriptive comparative correlational research design provided a systematic analysis of the data and complete evidence of the research problem.

2.2. Sampling

The Higher education institutions (HEIs) in China are the best place to hone volleyball players for national and international competitions. Thus, the sample or portion of the research population for the proposed study was collected using stratified purposeful sampling. Despite the limitation for generalization, purposeful random identifies a population of interest and develops a systematic way of selecting cases that was not based on advanced knowledge of how the

outcomes would appear. The use of a randomized sampling strategy, even when identifying a small sample, could increase credibility. In this study, the sample were college students who enrolled or currently enrolled in volleyball course.

The selection of the sample size within each higher education institutions took into account criteria such as proportionate representation and statistical significance. The criteria ensure the relevance to the respondents such as college students in China. They came from the five pre-selected universities namely Guangxi Normal University, Guangxi Minzu University, Guilin University of Electronic Technology, Guilin University of Technology, and Beibu Gulf University. The total number of respondents is 438.

2.3. Instrumentation

The study investigated the impact of college students' tactical skills in volleyball courses so the research instrument to be used is adopted from the athletic survey by the Junior Volleyball Association (n.d.). The adopted survey has 40 items covering safety, physical conditioning, management of equipment and facilities, team consideration, and instructor in volleyball. However, some items were modified to suit the needs and purpose of the study.

Likewise, the assessment of the tactical skills of college students was evaluated using questions on their defensive and offensive capabilities. Based on the findings of Parente et al. (2020), the offensive tactical skills of college students in volleyball courses are: (1) Direct the serve; (2) Throw the ball in empty spaces; and (3) Spot empty spaces. While the defensive tactical skills are: (1) Setting up the attack; (2) Intend to contact with the ball; and (3) Occupying court spaces. These items were included in the survey questionnaire part 2 where students rated their responses in Likert Scale.

These adopted research instruments were believed to solicit meaningful and specific evaluation of the effects of volleyball courses on college students which answered the research questions.

2.4. Data Gathering Procedures

As the research paradigm outlines, the research conducted a thorough and rigorous data-gathering process to achieve its purpose. First, the adopted research tools for the study underwent university approval to check their validity and appropriateness for the proposed study. Guided by the concepts from extant literature and empirical investigations, the adopted questionnaires were validated by experts and used in this study to collect data on the effects of volleyball as evaluated by the college student respondents.

Then, the purposeful sampling was conducted to select college students from five higher education institutions in China namely Guangxi Normal University, Guangxi Minzu University, Guilin University of Electronic Technology, Guilin University of Technology, and Beibu Gulf University to present diverse data on the study. Permission to conduct research including the adopted survey questionnaires may be handed over physically or sent via an online platform to the school officials of the involved universities to allow college student respondents to participate in the study. This process adhered to the preferred process of each university with recommendations of coordinators and class advisers.

Then, explicit research guidelines were communicated to the participants so they would effectively complete the surveys with utmost consideration of research ethics. The

conduct of the questionnaire distribution has not impeded the college students' class schedules and other school activities. It was done out of their free will with respect to their availability.

After the respondents completed the survey questionnaire, the data underwent rigorous processes for data entry to ensure its validity and reliability. The statistical analysis was employed to encapsulate the demographics of the participants using descriptive statistics; to compare between the evaluation of the volleyball course and the respondents' profile using comparative statistics; and to associate between the evaluation of the volleyball course and the respondents' tactical problem using correlative analysis.

Therefore, the validation of questionnaires, accomplishment of the questionnaires, ethical considerations, and statistical analysis and interpretation were systematically done to ensure the high quality and reliability of the findings that greatly contributed to the designing of the teacher development for volleyball instructors in colleges and universities.

2.5. Statistical Treatment

The research was designed to conduct a descriptive comparative method which involved the following statistical analyses:

Descriptive Statistics was employed to establish the common average between profiles of college students. It consisted of the use of means, standard deviations, frequencies, and percentages to describe the characteristics of the respondents and their range of responses.

Comparative Analysis was employed to examine the patterns of similarities and differences, if there were any, between the evaluation of volleyball courses based on their demographic characteristics.

Correlational Analysis was used to analyze quantitative data collected through research methods like surveys and live polls. It identified the relationship, patterns, significant connections, and trends between the evaluation of volleyball courses and tactical problems of college students.

The scale of Interpretation was used as a common reference point for discussing interpretations, facilitating clearer dialogue among different audiences. The interpretation of the statistical results was based on the scale 1.00-1.50 for strongly disagree (very low); 1.51-2.50 for disagree (low); 2.51-3.50 for agree (average); and 3.51-4.00 for strongly agree (high).

3. RESULTS, ANALYSIS, AND INTERPRETATION

This chapter presents the data in a tabular style and provides a thorough description and analysis of the data. The conclusions in this section are derived from a statistical analysis performed using Jamovi 2.3.23.

The suitability of the parametric test for the research aims evaluated by employing the Shapiro-Wilk test, a statistical test designed to measure normality. Parametric testing was conducted when the p-value was greater than 0.05. The conformity of the data to a uniform distribution was questionable when the p-values were below 0.05. Consequently, non-parametric testing was utilized.

The research inquiries mentioned in this article were revisited. As a result, the outcomes were presented alongside their justifications and analysis.

Preliminary Analysis

Table 1. (Table A) Reliability Measurement – Assessment of the Impact of Tactical Skills (Cronbach’s Alpha)

Construct	Cronbach’s Alpha	No. of Item/s Deleted	No. of Item/s Retained
Safety	0.89	0	6
Physical Conditioning	0.92	0	6
Management of Equipment and Facilities	0.92	0	6
Team consideration			
Instructor	0.84	0	5
	0.95	0	12

Assessment of Tactical Skills (Cronbach’s Alpha)

Construct	Cronbach’s Alpha	No. of Item/s Deleted	No. of Item/s Retained
Offensive skill	0.89	0	6
Defensive skill	0.89	0	4

Table 1. Table B

Normality

	N	Shapiro-Wilk	
		W	p
Impact of Tactical Skills	438	0.91	< .001
Tactical Skills	438	0.91	< .001

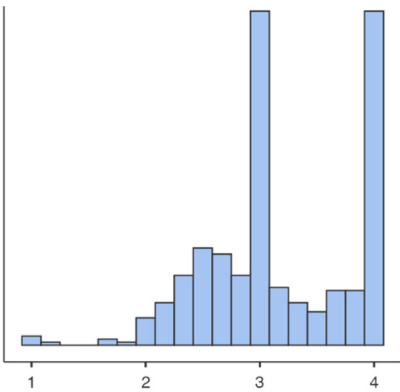


Fig 3. The histogram shows that the data is skewed

Based on the analysis of the Shapiro-Wilk test in Table B, it generated p-values that were lower than 0.05, and the histogram shows that the data is skewed, so the researcher assumed that the data was not regularly distributed. Therefore, the researcher employed non-parametric tests like the Mann-Whitney U and Spearman's rho correlation to determine if there was a significant difference and relationship among the variables.

Regarding their year level, 43% of them were in their first year; 38% were in their second year, 11% were in their third year, and a mere 9% were in their fourth year. These statistics suggested that a large proportion of the students were in their first year of study. These results were different from the findings of Zhao (2024) where the majority of the group comprised third-year college students, while first-year students trailed behind.

Based on their course selection, 8% of students are pursuing business administration, 12% are studying computer science and technology, 4% are enrolled in design studies, 18% are pursuing education, 26% are studying engineering, 13% are focused on linguistics, and 6% are studying mathematics

and applied mathematics. The data indicated that a significant proportion of the students were pursuing engineering studies.

4. Impact of the College Students’ Tactical Skills in Playing Volleyball

4.1. Safety

Table 2 demonstrates how participants rated the impact of tactical skills in volleyball on safety. The collected statistics show that the composite mean score is 3.48 with a standard deviation of 0.52, implying an average rating. This indicates their agreement with the availability of first aid assistance (M = 3.47), the regular use of safety equipment and clothing (M = 3.43), and the holding of safe practice sessions (M = 3.37). Conversely, it appears they strongly concurred with the provision of safety warnings before the game (M = 3.57) and the teaching of safe competing strategies (M = 3.55).

Safety is a top priority in playing volleyball and teachers should ensure that everyone has a safe and positive volleyball experience in school or university. This includes proper behavior for both students and teachers aligned with the code

of conduct and ethics which is introduced to students during orientation of the volleyball course (FIVB, 2021).

Table 2. Assessment of the Impact of Tactical Skills in Playing Volleyball in terms of Safety

Indicators	Mean	SD	V.I	Rank
1. Safe competitive techniques are taught.	3.55	0.57	High	2
2. Safe practice sessions are conducted.	3.37	0.66	Average	6
3. Facilities are safe to use.	3.52	0.57	High	3
4. Safety gears and clothes are consistently used.	3.43	0.65	Average	5
5. Safety reminders are delivered before the game.	3.57	0.56	High	1
6. The availability of first aid help is assured.	3.47	0.62	Average	4
COMPOSITE MEAN	3.48	0.52	Average	

Legend: 1.00-1.50: Strongly Disagree (Very Low); 1.51-2.50: Disagree (Low); 2.51-3.50; Agree (Average); 3.51-4.00: Strongly Agree (High)

4.2. Physical Conditioning

Table 3. Assessment of the Impact of Tactical Skills in Playing Volleyball in terms of Physical Conditioning

Indicators	Mean	SD	V.I	Rank
1. Playing volleyball affects my endurance and conditioning.	3.40	0.71	Average	1.5
2. Playing volleyball affects my quickness and agility.	3.36	0.76	Average	5
3. Playing volleyball affects my muscular power.	3.36	0.74	Average	5
4. Playing volleyball affects my body control and awareness.	3.36	0.76	Average	5
5. Playing volleyball affects my lateral strength (foot movements) and speed.	3.39	0.72	Average	3
6. Playing volleyball affects my core strength (extends beyond the abs and includes the posterior (upper back down to hamstrings and glutes and rotational parts of the body like the obliques).	3.40	0.72	Average	1.5
COMPOSITE MEAN	3.38	0.68	Average	

Legend: 1.00-1.50: Strongly Disagree (Very Low); 1.51-2.50: Disagree (Low); 2.51-3.50; Agree (Average); 3.51-4.00: Strongly Agree (High)

In terms of physical conditioning, Table 3 summarizes the evaluation of the impact of tactical skills in volleyball. The composite mean score is 3.38, with a standard deviation of 0.68, reflecting a data-driven average rating. This means that the college students agreed that volleyball improved their endurance and conditioning ($M = 3.40$); playing volleyball improved their core strength, which extended beyond the abs and included the posterior and upper back down to the hamstrings and glutes, as well as rotational parts of the body like the obliques ($M = 3.40$); and playing volleyball improved their lateral strength (foot movements) and speed ($M = 3.39$). According to their responses, items 1 and 6 had the highest mean score, followed by items 2 (playing volleyball impacts my quickness and agility), 3 (playing volleyball affects my muscular power), and 4 (playing volleyball affects my body control and awareness).

The effects of volleyball on the endurance and conditioning of students were evident as well in the findings of the study that revealed a strong correlation between the skill development of young volleyball players and the enhancement of their special endurance. Special endurance in this context refers to a combination of vital physical attributes and functional capabilities required for executing technical and tactical maneuvers with maximum efficiency and minimal expenditure during both training sessions and competitive events. A comprehensive assessment of special

endurance includes evaluations of jumping ability, speed, and gaming endurance (Faizrahmanov et al., 2017).

Likewise, the respondents claimed that volleyball affects their core strength which was supported by Lestari et al. (2020). They observed that core stability exercises when performed consistently, engaged specific muscles in the spine, pelvis, and hip regions. These movements and contractions were designed to enhance overall core strength, spine-pelvis-hip coordination, and nerve control. This improvement in strength could have a positive impact on a volleyball player's ability to execute powerful smashes, well-placed service punches, explosive jumps for smashes and blocks, and quick sprints to catch the ball.

4.3. Management of Equipment and Facilities

The study found a composite mean score of 3.22 with a standard deviation of 0.67, indicating an average rating. According to the data, respondents agreed that all volleyball facilities were adequately structured in secure locations ($M = 3.42$); they were easy to use ($M = 3.31$) and were well-maintained ($M = 3.25$).

These results showed that in China, many colleges and universities provide a range of facilities and resources for volleyball players. Most colleges have dedicated indoor volleyball courts which are typically equipped with regulation-size nets, padded floors to reduce impact injuries,

and seating for spectators. As for training facilities, some institutions offer specialized training areas that include weight rooms, fitness centers, and physiotherapy clinics. These facilities help players improve their strength, agility, and overall fitness. During off-seasons or for special training programs, some institutions offer access to facilities for training camps. These facilities and programs help support and develop student-athletes in China, providing opportunities for both competitive play and recreational enjoyment.

Likewise, clear scheduling and organization help in managing the use of facilities, allowing for multiple teams or classes to use the space without conflicts. In addition, secured facilities protect valuable equipment from theft or vandalism. This includes locking up nets, balls, and other gear when not in use. Ensuring the facility is secure helps protect players and staff from unauthorized access or potential harm.

Lastly, proper organization includes regular cleaning and maintenance, which helps in preventing the spread of germs and maintaining a healthy environment. Regular checks and maintenance ensure that the facility remains in good condition, preventing issues that could affect player safety or performance. This condition boosts the players' experience and morale. A well-organized facility reflects a commitment to the sport and the athletes, which can boost player morale and foster a sense of pride in their environment. Secure and well-organized facilities contribute to a positive experience, making it more enjoyable for players to train and compete (Zhou & Ren, 2014).

However, item 6 (all volleyball facilities include a drinking fountain) had the lowest mean score of 3.00. This result showed that not all volleyball facilities in universities in China have drinking fountains. Hydration is crucial for maintaining the peak performance of players and students which helps in sustaining energy levels and concentration during practice and games. Providing drinking fountains in volleyball facilities prevents dehydration, which can lead to fatigue, dizziness, and impaired physical function. It also helps in preventing heat-related illnesses, such as heat exhaustion or heat stroke. Also, having a drinking fountain readily available ensures that players have easy access to water without having to leave the facility or interrupt their training or gameplay. It reduces the need for players to bring their water bottles or repeatedly leave the court to get water, which helps in maintaining the flow of practice or matches. A drinking fountain provides a clean and reliable source of water, reducing the need for disposable plastic bottles and helping to minimize environmental impact. Drinking fountains are typically designed to minimize the risk of contamination, ensuring that the water remains safe for consumption, and can reduce the ongoing costs associated with providing bottled water or other drinks for players, making it a cost-effective option for maintaining hydration. By promoting the use of a drinking fountain in volleyball facilities, schools can contribute to sustainability efforts by reducing plastic waste from single-use water bottles.

4.4. Team Consideration

The data analysis revealed that the participants agreed that player selection was based on skill, knowledge, or physical capabilities ($M = 3.50$) and that they contributed to the team (e.g., tactical skills, moral support, etc.) ($M = 3.48$). The results supported the literature that the physical attributes of body height, body mass index (BMI), and standing jump

reach (SJR) were reliable indicators for distinguishing volleyball players who were selected and those who did not qualify. Additionally, the similar performance in vertical jump, sprint, and agility tests among selected and non-qualified players underscored the crucial role of body height and BMI in the selection process of volleyball players selection (Tsoukos et al., 2019).

5. SUMMARY OF FINDINGS

The study examined the effects of volleyball on college students in China as a basis for teaching development in universities and colleges. Using descriptive comparative correlational research design, the following findings were attained.

According to the respondents' profile, more than half of the population was male, showing that male students make up the majority of the group mostly first-year college students pursuing engineering studies.

The college students evaluated the impact of their tactical skills in playing volleyball. The factors of safety and instructor received the highest assessment while the management of equipment and facilities had the lowest assessment.

There was a significant difference in the assessment of the management of equipment and facilities domain based on the respondents' year levels, with a small effect size. On the other hand, no significant difference was found in safety, physical conditioning, team consideration, instructor, and overall experience of college students in playing volleyball. Comparing the groups, 1st and 2nd year students scored higher in management of equipment and facilities than those 3rd year students.

Likewise, there was no significant difference in the assessment of the impact of the college students' tactical skills in playing volleyball when they were grouped according to their courses.

Overall, the college students were assessed to have average tactical skills in playing volleyball. Specifically, offensive tactical skills scored higher than defensive tactical skills.

5.1. Conclusion

Based on the summary of findings, the following conclusions were drawn:

The college students enrolled in volleyball courses in China were mostly male in their first year taking engineering programs.

In the assessment of the impact of tactical skills in playing volleyball, the factors of safety and instructor demonstrated the most positive impact for the respondents. However, it was notable that the management of equipment and facilities evidently was the area to be improved in implementing volleyball courses at the university.

The lack of significant difference in the assessments of safety, physical conditioning, team consideration, instructor quality, and overall experience in a volleyball course according to students' year levels could be due to the standardized program because the volleyball course standardized curriculum and set of practices ensure consistency across all year levels.

Comparing the groups, the 1st and 2nd-year students might view the management of equipment and facilities as more important or integral to their experience, whereas 3rd-year students might prioritize other aspects of their training and performance.

Insignificant differences in the assessment of the impact of the college students' tactical skills in playing volleyball according to their courses can be attributed to their standardized training where all students, regardless of their course or major, might receive similar levels of training and coaching in tactical skills. This standardization ensures that students from different courses have comparable tactical skills, leading to similar assessments.

College students' offensive tactical skills often receive more emphasis in training and practice. The offense tactical skill is typically more dynamic and visible, encouraging more focus and development, whereas defensive skills might be less prioritized or more challenging to refine. Delving into specific coaching methods and practice habits could provide further insights into this trend.

The correlation between the impact of tactical skills and the students' tactical skills likely stemmed from the fact that those who excelled in their tactical abilities can better execute strategies, adapt during play, and contribute to overall team performance. Delving into how individual skill levels influence and enhance game strategy might reveal more about this relationship.

The implications of the study inform educators and curriculum developers about effective teaching strategies and course designs that enhance students' tactical understanding of volleyball. This can lead to improved instructional methods. Second, volleyball instructors can use the insights to refine their coaching techniques, focusing on the tactical aspects that most effectively improve student performance. Lastly, the study may highlight specific tactical skills that students struggle with, allowing instructors to tailor training sessions to address these gaps, ultimately leading to more effective player development.

5.2. Recommendations

Based on the research conclusions, the following recommendations were put forward:

1. Volleyball courses in tertiary education should be offered to higher-level college students across courses. The college juniors and seniors can be involved in peer tutoring with freshmen and sophomores for collaborative learning. In this way, female college students may have the opportunity to play volleyball alongside male players.

2. The management of equipment and facilities should be strengthened through a combination of organizational strategies, routine practices, and education. First, college students can be assigned responsibility as the equipment manager through the designation of the teacher. The designees will develop a checklist for pre- and post-practice sessions and games. This ensures that all necessary equipment is set up, checked for damage, and packed away properly. Second, the teacher will conduct regular inspections of equipment to identify wear and tear. Schedule periodic checks to ensure that everything is in good condition and replace items as needed. Third, the university should ensure that equipment is stored properly when not in use. Use designated storage areas, organize items to prevent damage, and keep everything clean and accessible. This may involve technology such as apps or software to track equipment usage, schedule maintenance, and manage inventory. This can streamline processes and improve efficiency. Fourth, teachers should educate the class about the importance of equipment management. This includes how to handle equipment carefully, the importance of reporting any issues, and the

impact of well-maintained gear on performance and safety. In this way, college students will take responsibility for their gear, including uniforms and personal equipment. This helps reduce loss and damage and instills a sense of ownership. Lastly, the sports manager or supervisor should periodically review the equipment management process to identify any issues or areas for improvement. Gather feedback from college students and volleyball teachers to make necessary adjustments.

3. College juniors and seniors should be highly involved in managing equipment and facilities in volleyball by leveraging their experience and leadership skills. This can be implemented through the initiative of the volleyball teacher in appointing leadership roles such as equipment managers and facility coordinators; training and mentoring and recognizing and rewarding. In these ways, college juniors and seniors not only enhance the management of equipment and facilities but also provide them with valuable leadership experience that can benefit their personal and professional development.

4. The defensive tactical skills of college students enrolled in volleyball courses need to be strengthened which involves a multifaceted approach that focuses on technical proficiency, strategic understanding, and practical application. Teachers need to implement focused drills on key defensive skills such as digging, passing, and blocking. Teachers can involve technology in their classes through video analysis of game footage and feedback sessions among students. The students' training should also involve strengthening physical conditioning by incorporating agility, speed, and strength exercises. Finally, teachers should implement team-based drills on defensive schemes that cover and support teammates during defensive plays, ensuring that players understand their roles and responsibilities.

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