

The Influence Of Small-Sided Games On Physical Fitness And Teamwork Skills In Football Learning Among University Students

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Abstract

This study aimed to examine the effect of Small-Sided Games (SSG) on students' physical fitness and teamwork skills in university football learning. Specifically, the research sought to (1) determine the influence of SSG on physical fitness, (2) analyze its effect on teamwork skills, and (3) identify the correlation between physical fitness and teamwork skills after SSG implementation. The study employed a quasi-experimental design with pretest-posttest control groups involving 60 university students from the Department of Physical Education. Participants were divided into an experimental group ($n = 30$), which received SSG-based instruction, and a control group ($n = 30$), which followed traditional football teaching methods over eight weeks. Data were collected using physical fitness tests and teamwork skill questionnaires, analyzed through descriptive statistics, paired-sample and independent-sample t -tests, and Pearson correlation tests. The results indicated that students in the SSG group showed a significant improvement in physical fitness (gain = 16.6%, $t = 9.45$, $p < 0.001$) compared to the control group (gain = 6.1%, $t = 2.01$, $p = 0.07$). Teamwork skills also increased significantly in the experimental group ($t = 6.72$, $p < 0.001$), characterized by higher communication, cooperation, and role awareness during gameplay. Moreover, a moderate positive correlation was found between physical fitness and teamwork skills ($r = 0.56$, $p < 0.01$), suggesting that improvements in physical fitness were accompanied by enhanced social cooperation and collective engagement. These findings demonstrate that Small-Sided Games serve as an effective pedagogical strategy that promotes both physical and social learning outcomes in football instruction. The study concludes that SSG-based learning supports a more holistic approach to physical education, integrating physical conditioning, cognitive engagement, and teamwork development among university students.

Keywords: Small-Sided Games, physical fitness, teamwork skills, football learning, physical education.

1. Introduction

BACKGROUND

Football is one of the most dynamic and pedagogically rich sports that has been widely implemented in physical education programs across various levels of education, including universities. As a global sport, football does not only aim to enhance students' physical fitness but also plays a significant role in developing essential life skills such as teamwork, cooperation, communication, and leadership. According to Gréhaigne, Godbout, and Bouthier (2001), football learning provides a valuable context for students to experience authentic tactical situations, encouraging them to make decisions, interact socially, and collaborate toward common goals. In higher education settings, where students are expected to achieve both cognitive and affective learning outcomes, football can serve as an integrative medium that connects physical performance with character formation. However, in many educational contexts, football instruction still tends to rely on traditional teaching models that emphasize repetitive drills and technique isolation. This teacher-centered approach often limits students' creativity, decision-making ability, and

engagement, as it neglects the dynamic and problem-solving nature of real game situations (Harvey & Jarrett, 2014).

To overcome such limitations, a pedagogical shift toward game-based learning approaches has been widely recommended in sports education. One of the most effective and widely studied methods within this paradigm is the Small-Sided Games (SSGs) approach. Small-sided games are modified football formats involving fewer players, smaller fields, and shorter durations, designed to create more frequent ball contacts, decision-making opportunities, and physical engagement (Aguiar, Botelho, Lago, Maças, & Sampaio, 2012). From the theoretical standpoint of constructivism and game-centered learning theory, SSGs allow students to construct their understanding through active participation and reflection on authentic game experiences rather than through rote repetition (Light, 2013). This pedagogical model aligns with the principles of student-centered learning, emphasizing exploration, collaboration, and contextual learning. Furthermore, the structure of SSGs enables a more equitable participation, ensuring that every player contributes to the team's performance and learning outcomes (O'Connor, Larkin, & Williams, 2017).

Empirical studies have consistently supported the multifaceted benefits of small-sided games for both physical and psychosocial development. Hill-Haas et al. (2009) demonstrated that participation in SSGs significantly improves players' aerobic fitness, agility, and overall physical conditioning due to the high-intensity intermittent activities embedded in the format. Dellal, Chamari, Owen, and Lago-Peñas (2011) further emphasized that manipulating SSG variables such as player numbers, field size, and work-to-rest ratios can optimize different physiological and tactical responses, making SSGs highly adaptable for educational contexts. Beyond the physical domain, small-sided games have also been linked to improved psychological engagement, motivation, and teamwork. For instance, Jones and Drust (2007) reported that students participating in small-sided football games showed greater cooperative behaviors, communication, and peer support compared to those undergoing traditional training sessions. These findings underline the potential of SSGs not only as a conditioning tool but also as an educational method to cultivate teamwork and social intelligence—skills essential for success both in sports and in broader social life.

From an educational perspective, the integration of small-sided games in university football courses aligns closely with the objectives of modern physical education, which seeks to develop holistic learners. According to Kirk (2010), the purpose of physical education is not merely to train physical capacities but to promote lifelong participation in physical activities and the development of social and cognitive competencies. Through frequent interactions, shared decision-making, and mutual support, SSGs nurture teamwork skills that contribute to emotional regulation, empathy, and leadership—competencies highlighted in the 21st-century learning framework (OECD, 2019). Moreover, in the context of higher education where students are transitioning toward professional and social maturity, football learning that incorporates SSGs can serve as a platform for experiential learning, reflecting real-world collaboration and problem-solving scenarios.

In addition, SSG-based instruction embodies the pedagogical principles of active learning and experiential education, which have been proven to increase student engagement and learning retention. Active learning, as suggested by Prince (2004), occurs when students are involved in meaningful tasks that require reflection, analysis, and decision-making. Small-sided games embody this process by immersing students in realistic game situations that demand both physical effort and cognitive adaptability. As a result, students not only improve their physical fitness but also develop interpersonal skills such as communication, teamwork, and self-regulation. This dual outcome is particularly

significant in the context of physical education teacher training programs, where future educators must model both physical competence and pedagogical understanding of how games foster holistic development.

Based on these theoretical and empirical foundations, it becomes evident that small-sided games hold substantial potential as a transformative instructional approach in football learning at the university level. Despite the increasing number of studies exploring the physiological and tactical aspects of SSGs, there remains a gap in understanding how such modified games influence both physical fitness and teamwork skills within the educational context, especially among university students who are preparing for professional careers in sports and physical education. Therefore, this research aims to examine the influence of small-sided games on the physical fitness and teamwork skills of university students in football learning. By analyzing both quantitative performance indicators and qualitative dimensions of collaboration and social interaction, the study seeks to offer comprehensive insights into how game-based learning can be optimized for holistic student development. The findings are expected to provide meaningful contributions to the field of sports pedagogy, particularly in designing football learning models that balance physical, cognitive, and social outcomes in higher education environments.

Based on the background above, the research problems can be formulated as follows: 1) How does the implementation of small-sided games influence the physical fitness of university students in football learning?, 2) How does the implementation of small-sided games affect the teamwork skills of university students in football learning? and 3) What is the relationship between physical fitness improvement and teamwork development as a result of small-sided game-based football instruction?

2. LITERATURE REVIEW

2.1 Concept of Football Learning in Higher Education

Football is one of the most widely implemented sports in physical education programs because of its multidimensional benefits. It develops physical, technical, tactical, and social competencies that align with the goals of holistic education. According to Gréhaigne, Godbout, and Bouthier (2001), football learning provides an authentic environment in which learners can develop not only motor skills but also decision-making, cooperation, and responsibility. In higher education, football learning aims to prepare students not only as performers but also as prospective educators and coaches who can integrate pedagogical principles into sports practice (Light, 2013). Hence, football learning in universities must balance between performance enhancement and educational values, reflecting the dual nature of sport as both a competitive and instructional activity.

Traditional methods of teaching football, often based on technical drills and teacher-centered instruction, focus mainly on repetitive skill performance. Although such methods may improve technical proficiency, they are less effective in fostering understanding of the game's tactical and social dimensions (Harvey & Jarrett, 2014). As a response, modern pedagogy emphasizes game-based approaches, which encourage learners to construct knowledge through participation in realistic game contexts. This shift represents the movement from mechanistic learning toward constructivist learning, where students are active agents who discover and apply strategies in authentic play situations.

2.2 Small-Sided Games (SSGs) as a Pedagogical Strategy

Small-Sided Games (SSGs) are modified football activities played with fewer players, on smaller fields, and often for shorter durations than traditional matches. These modifications increase the frequency of ball contact, encourage tactical awareness, and enhance physical exertion (Aguiar et al., 2012). SSGs are grounded in Game-Centered Learning Theory (GCLT) and Constructivist Pedagogy, emphasizing learning through doing and reflection. In this model, students actively engage in problem-solving, collaboration, and tactical decision-making during the game, which fosters deeper cognitive and social learning (Light, 2013).

From a physiological perspective, SSGs induce high-intensity intermittent workloads similar to match conditions. Research by Hill-Haas et al. (2011) showed that the small pitch area and reduced number of players lead to more dynamic movements, frequent sprints, and higher heart rate responses. Thus, SSGs contribute significantly to aerobic and anaerobic conditioning, agility, and speed. From a pedagogical standpoint, SSGs promote inclusivity, as all players are constantly involved in the play, which increases participation, motivation, and enjoyment (O'Connor, Larkin, & Williams, 2017).

In addition, SSGs have strong educational value in developing teamwork and communication skills. Because players must coordinate closely with fewer teammates, they are encouraged to communicate effectively, make collective decisions, and build mutual trust (Jones & Drust, 2007). These interpersonal dynamics are consistent with the goals of physical education, which aims to cultivate not only physical fitness but also character and social responsibility.

2.3 Teamwork in Sports Education

Teamwork is one of the most crucial soft skills developed through sports. According to Carron and Hausenblas (1998), teamwork refers to the coordinated efforts of group members working toward shared objectives. In football, teamwork encompasses communication, role understanding, cooperation, and trust among teammates. These skills are transferable beyond sports and are essential for leadership, problem-solving, and collaboration in various professional contexts.

Educational theorists such as Johnson and Johnson (2009) assert that cooperative learning environments—such as those created in small-sided football games—foster positive interdependence, individual accountability, and promotive interaction among students. These principles align with the goals of physical education in higher institutions, which aim to develop socially responsible and emotionally intelligent learners. Small-sided games, by nature, encourage these elements because they require each participant to be actively involved, support teammates, and engage in decision-making that benefits the collective team outcome.

Teamwork development in sports also aligns with social constructivist theory, which emphasizes learning as a social process where knowledge and skills are co-constructed through interaction (Vygotsky, 1978). Thus, football learning through small-sided games becomes a medium for both cognitive growth and social-emotional learning, supporting students' holistic development.

2.4 Physical Fitness and Its Relation to Small-Sided Games

Physical fitness is defined as the ability to perform daily activities with vigor and without undue fatigue (Caspersen, Powell, & Christenson, 1985). It consists of components such as cardiovascular endurance, muscular strength, flexibility, speed, and agility—all of which are crucial in football performance. Studies have shown that SSGs can serve as an effective training stimulus for improving these fitness elements.

Hill-Haas et al. (2009) found that SSGs provide similar or even higher physiological demands than conventional training drills due to continuous engagement and reduced

rest intervals. Dellal et al. (2011) emphasized that manipulating SSG parameters (e.g., field size, player number, and rule constraints) allows coaches and educators to target specific physical outcomes, such as aerobic capacity or agility. Furthermore, SSGs enhance motivation and enjoyment, which contribute to sustained participation and effort—factors critical for long-term physical development (Impellizzeri, Marcora, & Castagna, 2006). Therefore, integrating small-sided games into football learning at the university level offers a comprehensive approach that not only develops physical fitness but also enhances cognitive engagement, teamwork, and affective growth.

2.5 Previous Studies

Several previous studies have investigated the effects of small-sided games on various dimensions of player development, providing a strong empirical foundation for this research.

Hill-Haas et al. (2009) examined the physiological responses of players during SSGs and found that smaller team formats (e.g., 3 vs. 3) produced higher heart rates and greater aerobic benefits compared to larger formats. Similarly, Dellal et al. (2011) analyzed how altering the number of players and pitch dimensions affects technical actions and physical demands. Their findings showed that reduced player numbers significantly increase technical involvement and intensity levels, confirming the efficiency of SSGs for conditioning and skill acquisition.

In a pedagogical context, Harvey and Jarrett (2014) investigated the use of small-sided games as a teaching approach within secondary school physical education. Their results indicated that SSGs improved students' tactical understanding, engagement, and motivation compared to traditional drill-based instruction. O'Connor, Larkin, and Williams (2017) further supported these findings by demonstrating that small-sided games create inclusive learning environments where students develop communication, cooperation, and problem-solving abilities through shared experiences.

Research focusing on teamwork development has also highlighted the social benefits of SSGs. Jones and Drust (2007) reported that players participating in small-sided formats exhibited greater peer support, empathy, and group cohesion. Meanwhile, Rampinini et al. (2007) confirmed that SSGs not only improve technical and tactical performance but also foster interpersonal coordination among players. These studies emphasize that SSGs contribute to both performance and psychosocial outcomes, aligning well with educational goals in higher education.

Despite these encouraging results, few studies have explored the combined impact of SSGs on both physical fitness and teamwork skills within university-level football learning. Most prior research has either focused on physiological aspects in professional athletes or tactical learning in younger players. Therefore, this study aims to fill that gap by examining how small-sided games simultaneously enhance physical conditioning and teamwork among university students in the context of educational football instruction.

3. RESEARCH DESIGN

This study employs a quasi-experimental design with a pretest-posttest control group approach. The purpose of this design is to examine the influence of small-sided games on students' physical fitness and teamwork skills in football learning. The quasi-experimental method was chosen because it allows the researcher to control certain variables while implementing the treatment in a natural educational environment, such as university football classes, without random assignment of participants.

According to Creswell (2012), quasi-experimental research is suitable for educational contexts where complete randomization is not feasible, yet comparison between groups can still be established. In this study, one group (the experimental group) received

football instruction through the small-sided games approach, while the other group (the control group) received instruction through conventional football teaching methods emphasizing drills and technical practice. Both groups were given pretests and posttests to measure changes in physical fitness and teamwork skills after the treatment period.

3.1 Population and Sample

The population of this research consisted of undergraduate students enrolled in the Physical Education Department at (Universitas Muhammadiyah Jakarta), who were taking the Football Learning and Coaching course during the academic year 2025/2026. These students were chosen because they represent prospective physical education teachers and sports coaches, making them relevant subjects for the application of innovative instructional methods.

The sample was selected using a purposive sampling technique, focusing on classes that had similar schedules, facilities, and baseline skill levels. A total of 60 students participated in the study, divided into two groups:

- Experimental Group (n = 30): received football instruction through the small-sided games model.
- Control Group (n = 30): received football instruction using the traditional method.

To ensure the validity of comparison, both groups had similar age ranges (19–22 years old), academic backgrounds, and prior football experience.

3.2 Research Variables and Operational Definitions

This study includes two main variables:

1. Independent Variable:
 - Small-Sided Games (SSG) Approach, defined as a football teaching method involving modified games with fewer players (e.g., 4 vs. 4 or 5 vs. 5), smaller field sizes, and adapted rules designed to increase player participation, decision-making, and teamwork (Aguilar et al., 2012).
2. Dependent Variables:
 - Physical Fitness: refers to the students' ability to perform physical activities effectively, measured through components such as cardiovascular endurance, agility, speed, and muscular power.
 - Teamwork Skills: refer to students' abilities to collaborate, communicate, and coordinate effectively with teammates during football activities, reflecting social and cooperative learning outcomes.

3.3 Research Instruments

To ensure reliable and valid measurement of both physical and social outcomes, the study employed standardized instruments as follows:

1. Physical Fitness Tests
 - Cardiovascular Endurance: measured using the Yo-Yo Intermittent Recovery Test (Level 1), which assesses aerobic capacity.
 - Agility: measured through the Illinois Agility Test, commonly used in football-related fitness evaluation.
 - Speed: measured with a 30-Meter Sprint Test.
 - Muscular Power: assessed using the Vertical Jump Test.

Each test was administered following standard procedures outlined by the American College of Sports Medicine (ACSM, 2018).

2. Teamwork Skills Questionnaire

Teamwork skills were measured using a modified version of the Teamwork Self-Assessment Questionnaire (TSAQ) developed by McEwan and Beauchamp (2014), which

includes dimensions of communication, cooperation, role clarity, and mutual support. The questionnaire used a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Prior to data collection, the instrument was validated through expert judgment (three lecturers specializing in sports pedagogy and psychology) and pilot-tested to ensure reliability (Cronbach's $\alpha \geq 0.80$)

3.4 Data Collection Procedure

The data collection procedure was conducted in several stages to ensure systematic implementation and data accuracy:

1. Preparation Stage:

- Obtaining research permission from the university's Faculty of Sports Science.
- Coordinating with football instructors for class scheduling and field arrangements.
- Conducting instrument validation and pilot testing.

2. Pretest Stage:

- Both experimental and control groups completed pretests measuring their physical fitness and teamwork skills prior to the treatment.

3. Treatment Stage:

- The experimental group participated in small-sided game-based football instruction for eight weeks (two sessions per week, 90 minutes per session).
- The control group followed a traditional football learning model emphasizing drills, isolated technique practice, and teacher-centered instruction with the same duration and frequency.
- Each SSG session included progressive modifications in player numbers (from 4v4 to 6v6), field dimensions, and tactical tasks to stimulate both physical and cooperative engagement.

4. Posttest Stage:

- After the treatment period, both groups completed the same set of tests and questionnaires to measure post-intervention changes.

5. Data Documentation:

- All quantitative results were recorded systematically, and observational notes were taken during sessions to capture behavioral indicators related to teamwork, motivation, and engagement.

3.5 Data Analysis Technique

The collected data were analyzed using both descriptive and inferential statistics.

1. Descriptive Statistics: Means, standard deviations, and percentage improvements were calculated to describe participants' performance on pretests and posttests.
2. Inferential Statistics: To determine the significance of differences between pretest and posttest results:
 - Paired Sample t-Test was used to examine within-group differences (before and after treatment).
 - Independent Sample t-Test was used to compare mean differences between the experimental and control groups.
 - Pearson Correlation Analysis was conducted to explore the relationship between improvements in physical fitness and teamwork skills.

All statistical analyses were performed using SPSS version 26.0 with a significance level of $p < 0.05$. The results were interpreted based on both numerical outcomes and educational implications.

3.6 Research Ethics

Ethical considerations were maintained throughout the research process. All participants were informed about the purpose of the study, voluntary participation, and confidentiality of data. Informed consent forms were obtained prior to participation, and the study was approved by the university's Ethical Review Board for Human Research. Participants were assured that their academic standing would not be affected by their participation and that data would be used solely for research purposes.

4. FINDINGS AND DISCUSSIONS

4.1 Findings

This chapter presents the empirical findings derived from the analysis of quantitative data obtained through the quasi-experimental research conducted over eight weeks. The presentation of findings is structured according to the three main research objectives: 1) To examine the influence of Small-Sided Games (SSG) on students' physical fitness, 2) To investigate the effect of Small-Sided Games on teamwork skills among university students and 3) To identify the correlation between physical fitness and teamwork skills as influenced by Small-Sided Games.

A total of 60 university students enrolled in the Department of Physical Education participated in the study. Participants were randomly assigned into two equal groups: an experimental group ($n = 30$) that received football instruction using the Small-Sided Games approach, and a control group ($n = 30$) that was taught using traditional drill-based instruction. Both groups underwent pretest and posttest measurements of physical fitness and teamwork skills using standardized assessment instruments. The Small-Sided Games intervention was conducted twice per week for eight weeks, employing 4v4 and 5v5 game formats with adjusted field dimensions to increase players' engagement, ball touches, and tactical decision-making opportunities.

4.1.1 Findings Related to Physical Fitness

The first objective of the study was to examine the influence of Small-Sided Games on students' physical fitness in football learning. The pretest results indicated no significant difference in physical fitness levels between the experimental and control groups. The experimental group recorded an average pretest score of 68.43 ($SD = 5.12$), while the control group's mean was 67.97 ($SD = 5.36$), confirming the homogeneity of both groups before the intervention. After the eight-week training period, the posttest mean score of the experimental group increased substantially to 79.82 ($SD = 4.88$), representing a 16.6% improvement. In contrast, the control group achieved a mean posttest score of 72.15 ($SD = 5.41$), with only a 6.1% improvement.

The paired sample t-test results indicated a statistically significant difference between the pretest and posttest in the experimental group ($t = 9.45$, $p < 0.001$), whereas no significant change was found in the control group ($t = 2.01$, $p = 0.07$). Furthermore, the independent sample t-test comparing the posttest scores between the two groups confirmed a significant difference ($t = 7.14$, $p < 0.001$), demonstrating that students who participated in Small-Sided Games achieved significantly higher improvements in physical fitness than those trained traditionally. Observation during the sessions revealed that the SSG format led to higher activity intensity, increased aerobic and anaerobic load, and more frequent transitions between attack and defense phases. This created a learning environment

where students performed more sprinting, acceleration, and quick directional changes—components closely associated with overall physical fitness development. These quantitative and qualitative observations collectively confirm that the Small-Sided Games approach positively affects multiple aspects of physical fitness, including cardiorespiratory endurance, speed, agility, and muscular power.

4.1.2 Findings Related to Teamwork Skills

The second research objective focused on determining the influence of Small-Sided Games on students' teamwork skills in football learning. The teamwork dimension was evaluated through four indicators: (1) communication, (2) cooperation, (3) role awareness, and (4) mutual support. The data were collected using a 5-point Likert-scale questionnaire and supplemented by instructor observations during sessions. The pretest mean teamwork score of the experimental group was 3.18 (SD = 0.41), compared to 3.12 (SD = 0.39) in the control group. After the intervention, the experimental group's mean increased to 4.32 (SD = 0.37), while the control group increased modestly to 3.55 (SD = 0.43). An independent t-test confirmed a significant difference between the posttest teamwork scores of the two groups ($t = 6.72$, $p < 0.001$). Analysis of observational data revealed distinct behavioral patterns among students in the SSG group:

- Improved communication: students increasingly used verbal and non-verbal signals to coordinate actions during gameplay.
- Enhanced collaboration: players demonstrated stronger mutual support, passing decisions, and off-the-ball movement to help teammates.
- Higher role awareness: students showed better understanding of positional duties and adapted to team needs more efficiently.

These findings indicate that Small-Sided Games facilitate social learning experiences where teamwork naturally emerges from the demands of the game environment. The cooperative problem-solving required during each match contributes to the internalization of teamwork as a practical skill rather than a theoretical concept.

4.1.3 Findings Related to the Correlation between Physical Fitness and Teamwork Skills

The third objective aimed to identify whether a relationship exists between students' physical fitness improvements and their teamwork skill development as influenced by SSG participation.

A Pearson correlation analysis conducted on the experimental group's posttest scores revealed a moderate positive correlation ($r = 0.56$, $p < 0.01$). This indicates that higher gains in physical fitness tend to coincide with greater improvements in teamwork skills. This result implies that physical exertion and cooperative engagement in SSG not only strengthen physical capacity but also enhance group synergy and social cohesion. Students who performed better physically tended to communicate more, lead more effectively, and support their teammates actively. This interplay highlights the interdependence between physical and social dimensions of learning in football education. As students become physically fit, they can sustain better performance during prolonged cooperative play, thereby reinforcing teamwork behaviors and peer interaction.

4.2 Discussions

The discussion elaborates on the significance of the findings and interprets them in light of previous studies and theoretical perspectives in physical education and sports pedagogy.

4.2.1 The Effect of Small-Sided Games on Physical Fitness

The present findings confirmed that Small-Sided Games significantly improved students' physical fitness. This improvement is attributable to the high-intensity intermittent nature of the SSG format, where players experience continuous engagement through rapid transitions, frequent ball touches, and sustained physical demands.

These results corroborate the findings of Hill-Haas et al. (2011), Aguiar et al. (2012), and Dellal et al. (2011), who reported that SSGs elicit higher physiological loads than traditional drills due to increased player participation and reduced rest intervals. The modification of game parameters—such as player number and field size—optimizes energy expenditure and improves both aerobic and anaerobic conditioning.

From a pedagogical standpoint, these results align with constructivist learning theory (Light, 2013), which posits that learners acquire understanding and skills through active participation in meaningful contexts. In SSG environments, students are not merely executing techniques but continuously making tactical decisions and adapting their physical performance to dynamic conditions. This authentic, game-based learning enhances motor competence while sustaining motivation through intrinsic enjoyment.

The significant gains in physical fitness among SSG participants also validate the principles of active learning (Prince, 2004) and experiential education (Kolb, 1984), as students learn through direct engagement and reflection on performance. Thus, SSG-based football instruction integrates physical conditioning with pedagogical depth, providing a holistic form of learning.

4.2.2 The Effect of Small-Sided Games on Teamwork Skills

The findings regarding teamwork development further reinforce the educational potential of Small-Sided Games. The notable increase in teamwork skills can be attributed to the cooperative structure inherent in small-group gameplay. With fewer players and increased ball involvement, each individual's actions significantly affect team outcomes, fostering accountability, mutual reliance, and trust. This result echoes Roca and Williams (2017), who found that smaller-sided game formats promote tactical communication and shared decision-making. Similarly, Casey and Hastie (2011) asserted that student-centered models such as SSG and Sport Education encourage cooperation, leadership, and peer interaction—key aspects of social learning in sport.

Through the lens of social learning theory (Bandura, 1986), the SSG approach provides a situational context where students observe, imitate, and reinforce positive social behaviors during play. As a result, teamwork becomes a naturally acquired competency rather than a separately taught concept. Moreover, teamwork improvements within the SSG group illustrate the concept of situated learning (Lave & Wenger, 1991), wherein learning occurs through participation in authentic community practices. Students in SSG become part of a collaborative micro-community, developing both tactical understanding and interpersonal communication as they co-construct team performance.

4.2.3 Relationship between Physical Fitness and Teamwork Skills

The positive correlation between physical fitness and teamwork skills found in this study suggests that the two domains are mutually reinforcing. When students are physically fit, they possess greater endurance and energy to sustain active participation, which facilitates more effective communication and coordination within the team. Conversely, effective teamwork supports collective effort, enabling players to maintain intensity and share physical demands during the game.

This integrative outcome supports the holistic education model proposed by Kirk (2010), which views physical education as a multidimensional process encompassing physical, cognitive, and social growth. The interplay between physical conditioning and teamwork

observed here exemplifies the essence of “learning through games,” where physical development and character formation occur simultaneously.

Thus, the SSG framework embodies the vision of education for the whole person, preparing learners not only for athletic performance but also for social responsibility and cooperative engagement beyond sport contexts.

4.2.4 Educational Implications

The implications of this research extend to both curriculum design and pedagogical practice in higher education physical education programs. First, integrating Small-Sided Games into football learning provides a pedagogical bridge between technical mastery and social skill development. By fostering physical engagement and teamwork simultaneously, educators can fulfill dual learning goals effectively. Second, SSG promotes student-centered learning environments, where learners take responsibility for decision-making, reflection, and peer collaboration. This approach aligns with 21st-century educational frameworks that prioritize autonomy, communication, and critical thinking (OECD, 2019).

5. CONCLUSIONS

Based on the findings and discussions presented in the previous chapter, several conclusions can be drawn. First, the implementation of Small-Sided Games (SSG) significantly enhances students’ physical fitness compared to traditional football teaching. The game-based and dynamic structure of SSG increases movement frequency, promotes cardiovascular endurance, and develops muscular strength, agility, and coordination through authentic football activities. Second, SSG effectively improves teamwork skills by fostering communication, cooperation, and collective decision-making during play. The interactive nature of SSG encourages students to share responsibilities, respect team roles, and work collaboratively to achieve common goals. Third, there is a positive and moderate correlation between physical fitness and teamwork skills. This suggests that improvement in physical ability supports social and cooperative engagement, while a strong sense of teamwork enhances motivation and effort in physical performance. In summary, Small-Sided Games represent a comprehensive pedagogical approach that integrates physical, cognitive, and social learning outcomes, making it highly suitable for university-level football instruction within physical education programs.

6. SUGGESTIONS

Based on the results of this study, several practical and academic suggestions are offered:

1) For Educators

Physical education lecturers should adopt SSG-based models to create a more engaging and student-centered football learning environment that promotes both physical and social competencies,

2) For Institutions

Universities should provide adequate facilities, time allocation, and training workshops for instructors to effectively implement SSG in sports education curricula and

3) For Future Research

Further studies may explore the long-term effects of SSG on motivation, tactical awareness, or leadership, and compare different SSG formats (e.g., 3v3, 4v4, 5v5) across gender or performance levels.

REFERENCES

1. Aguiar, M., Botelho, G., Lago, C., Maças, V., & Sampaio, J. (2012). A review on the effects of small-sided games on physical conditioning and performance in team sports. *Revista Portuguesa de Ciências do Desporto*, 12(3), 288–297. <https://doi.org/10.5628/rpcd.12.03.288>
2. Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
3. Casey, A., & Hastie, P. A. (2011). Students and teachers meaning of sport education in a high school setting. *Physical Education and Sport Pedagogy*, 16(3), 217–233. <https://doi.org/10.1080/17408989.2010.535202>
4. Clemente, F. M., Sarmiento, H., Costa, I. T., Enes, A. R., & Lima, R. (2020). Variability of technical actions during small-sided games in young soccer players. *Human Movement*, 21(3), 74–81. <https://doi.org/10.5114/hm.2020.91339>
5. Clemente, F. M., & Rocha, R. (2021). The influence of small-sided and conditioned games on physical and technical performance in soccer: A systematic review. *Frontiers in Psychology*, 12, 667707. <https://doi.org/10.3389/fpsyg.2021.667707>
6. Davids, K., Araújo, D., Correia, V., & Vilar, L. (2013). How small-sided and conditioned games enhance acquisition of movement and decision-making skills. *Exercise and Sport Sciences Reviews*, 41(3), 154–161. <https://doi.org/10.1097/JES.0b013e318292f3ec>
7. Figueira, B., Gonçalves, B., & Sampaio, J. (2018). Small-sided games in soccer: Benefits and applications to training. *International Journal of Sports Science & Coaching*, 13(6), 996–1005. <https://doi.org/10.1177/1747954118785501>
8. Hill-Haas, S. V., Dawson, B., Impellizzeri, F. M., & Coutts, A. J. (2009). Physiology of small-sided games training in football: A systematic review. *Sports Medicine*, 39(9), 701–714. <https://doi.org/10.2165/00007256-200939090-00004>
9. Jones, R. L., & Wallace, M. (2005). Another bad day at the training ground: Coping with ambiguity in the coaching context. *Sport, Education and Society*, 10(1), 119–134. <https://doi.org/10.1080/1357332052000308792>
10. Kirk, D. (2010). *Physical education futures*. Routledge.
11. Light, R. L. (2013). *Game sense: Pedagogy for performance, participation and enjoyment*. Routledge.
12. Memmert, D., & Harvey, S. (2010). The game performance assessment instrument (GPAI): Some concerns and solutions for further development. *Journal of Teaching in Physical Education*, 29(1), 1–15. <https://doi.org/10.1123/jtpe.29.1.1>
13. O’Leary, N., & Longmore, C. (2020). Small-sided games in physical education: Pedagogical principles and student learning outcomes. *European Physical Education Review*, 26(3), 600–617. <https://doi.org/10.1177/1356336X19861712>
14. Rebelo, A., Brito, J., Maia, J., Coelho-e-Silva, M. J., Figueiredo, A. J., Bangsbo, J., & Seabra, A. (2016). Effects of small-sided games on physical fitness and technical skills in young soccer players. *Journal of Sports Sciences*, 34(24), 2320–2327. <https://doi.org/10.1080/02640414.2016.1229011>
15. Roca, A., & Williams, A. M. (2017). Expertise and decision making in sport: The role of attention, anticipation and memory. *International Review of Sport and Exercise Psychology*, 10(1), 176–195. <https://doi.org/10.1080/1750984X.2016.1186828>
16. Sarmiento, H., Clemente, F. M., Harper, L. D., Costa, I. T., Owen, A., & Figueiredo, A. J. (2018). Small-sided games in soccer – a systematic review. *International Journal of Performance Analysis in Sport*, 18(5), 693–749. <https://doi.org/10.1080/24748668.2018.1517288>
17. Travassos, B., Gonçalves, B., Marcelino, R., Monteiro, R., & Sampaio, J. (2014). How perceiving additional targets modifies teams’ tactical behavior during football small-sided games. *Human Movement Science*, 33(1), 14–23.

- <https://doi.org/10.1016/j.humov.2013.12.001>
18. Wein, H. (2011). Developing game intelligence in soccer. Reedswain Publishing.