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Correspondence Between Small-Sided Games Implementation and Competitive Ball Progression in Elite Football: A Retrospective Case Study

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ABSTRACT

Background & objective: Small-sided games (SSGs) are widely used in football because they manipulate player numbers, playing area, rules, while preserving key features of match play. However, evidence linking SSG implementation to ball progression during elite competition remains limited when SSGs are embedded in a real-world preparation programme rather than imposed experimentally. This study examined the correspondence between SSG implementation and ball progression performance in the East Java Provincial Football Team during the 2024 National Sports Week (PON XXI).

Materials & Methods: A quantitative ex post facto performance-analysis design was used. Official training documentation, match recordings, match statistics, were reviewed. The performance dataset comprised three PON matches against Papua Pegunungan, West Java, and Aceh. SSG implementation was characterised by player-number modification, playing-area manipulation, game constraints, intensity, and training objectives. Ball progression was assessed using passing accuracy, attacking-third passes, successful progressive passes, through passes, and chances created. Descriptive statistics were used because the available dataset did not support a valid participant-level inferential model. STROBE was used as the reporting framework.

Results: Across the three analysed matches, possession ranged from 31% to 47% and passing accuracy from 63.46% to 72.87%. Successful progressive passes ranged from 19 to 40, successful attacking-third passes from 80 to 115, and chances created from 2 to 7. Progressive passing and through passes were present in all three matches. Training documentation showed consistent alignment between SSG characteristics and observed attacking indicators; however, no causal or statistically significant contribution estimate could be established.

Conclusions: In this elite provincial-team case, SSG implementation was consistently accompanied by progressive passing and attacking-third progression across different match contexts. The international contribution is applied and methodological: naturally implemented, representative game-based training can be examined alongside competitive performance while separating correspondence from causal effectiveness. Controlled longitudinal studies are needed to estimate effect magnitude and mechanisms.

Keywords

small-sided games; ball progression; football performance analysis; tactical training; representative learning design.

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INTRODUCTION

Contemporary football is a dynamic invasion sport in which successful attacking performance depends on the interaction of technical execution, tactical organisation, perception, and decision-making under continuously changing spatial and temporal constraints. In competitive environments, possession of the ball is not necessarily equivalent to effective attacking performance. A team may maintain substantial possession without consistently advancing the ball into threatening areas, whereas a team with comparatively less possession may generate effective attacks by progressing the ball efficiently through forward passes, penetration, movement, and transitions. A systematic review of performance indicators related to ball possession in football concluded that possession percentage alone does not consistently explain competitive success and should therefore be interpreted alongside complementary technical, tactical, and contextual indicators (Jackson et al., 2026, p. 11; Wang et al., 2022).

Consequently, analysing how possession is transformed into forward-oriented attacking actions may provide a more functionally meaningful assessment of competitive performance than possession volume alone.

Ball progression can be conceptualised as the functional advancement of possession toward more advantageous attacking locations. It involves not only the successful completion of passes but also the ability to penetrate defensive lines, exploit available space, connect teammates, and make appropriate decisions under pressure. Recent performance-analysis research has further indicated that the structure and route of passing can be associated with subsequent attacking outcomes, reinforcing the importance of examining the function of possession rather than treating possession volume as an isolated performance construct (Cao, 2024; Casal et al., 2019, p. 501; Jackson et al., 2026, p. 3).

Small-sided games (SSGs) have become an established

component of football training because they allow coaches to manipulate task constraints while retaining important characteristics of match play. Variations in player numbers, relative pitch area, scoring rules, touch restrictions, work-to-rest ratios, and tactical objectives can alter the informational, technical, tactical, and physiological demands experienced by players. Reviews of SSG research have demonstrated that such manipulations can influence physiological load, technical actions, and tactical behaviour, although the magnitude and direction of these effects depend substantially on task configuration and player characteristics (Clemente, Afonso, et al., 2021; Clemente, Aquino, et al., 2021; Hill-Haas et al., 2011).

From a constraints-led and ecological-dynamics perspective, SSGs can be understood as representative practice environments in which players continuously adapt their behaviour to interactions among individual, task, and environmental constraints (Clemente et al., 2021, p. 2; Nunes et al., 2020, p. 1465). Manipulating the number of players, available space, rules, scoring conditions, and tactical objectives changes the opportunities for action and the information that players must perceive and use (Vilar et al., 2014, p. 1017). Representative practice therefore seeks to preserve meaningful relationships between perception, decision-making, and action rather than treating technical execution as an isolated skill detached from the tactical context in which it is performed (Ashford et al., 2020, p. 136; Kannan, 2026). Recent work in elite football coaching has similarly emphasised contextual and game-based practice as a means of aligning training environments with the complexity of competitive performance.

This theoretical perspective creates an important distinction between performance within the training task and performance expressed during official competition (McCosker et al., 2019, p. 917; Woods et al., 2020, p. 36). Although SSGs can modify player behaviour within training, the extent to which characteristics developed or emphasised in such tasks are subsequently reflected in competitive performance remains an important empirical question (Clemente et al., 2021, p. 2). Examining this potential training-to-competition relationship is particularly relevant in elite football, where training programmes are embedded within complex

preparation environments rather than delivered as isolated experimental interventions.

Critical Review of Existing Evidence Research Gap, Novelty, and Contribution Study Objective and Research Question

The primary objective of this study was to examine whether the characteristics of naturally implemented SSGs within the East Java Provincial Football Team's preparation programme were descriptively reflected in competitive ball-progression performance during the 2024 National Sports Week (PON XXI).

The secondary objectives were to: 1) describe match-to-match variation in possession and passing performance; 2) characterise successful progressive passing and attacking-third passing across the analysed matches; 3) examine the occurrence of through passes and chances created across different competitive contexts; and 4) identify whether forward-oriented performance patterns were consistently observable across the three analysed official matches.

Given the retrospective observational design, the limited number of match-level observations, and the absence of quantified individual SSG exposure, the study does not formulate or test a causal hypothesis. Instead, it addresses the following research question: To what extent are the characteristics of naturally implemented small-sided games descriptively reflected in competitive ball-progression patterns across the analysed PON XXI matches of the East Java Provincial Football Team?

The research question is deliberately framed around descriptive ecological correspondence rather than causal effectiveness. This distinction is essential because the study does not include a control condition, experimental manipulation, baseline competitive comparison, or player-level exposure-outcome linkage.

Global and Theoretical Context

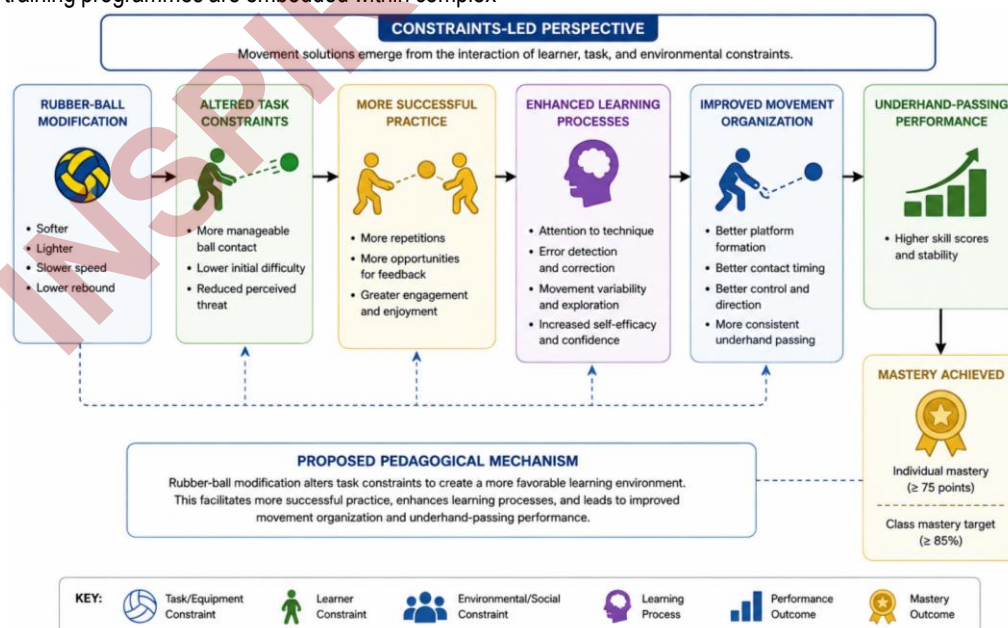


Figure 1. Conceptual Pathway of Rubber-Ball-Based Instruction for Volleyball Underhand-Passing Learning

Figure 1 presents the proposed conceptual pathway underlying the use of rubber-ball media in primary-school volleyball

instruction. From a constraints-led perspective, modifying the physical properties of the ball may alter the task constraints

experienced by learners, potentially making ball contact and movement execution more manageable during the early stages of skill acquisition. A more manageable task may provide greater opportunities for successful practice, repetition, and teacher feedback (Chow et al., 2025; Liu, 2023, p. 3). These learning conditions are proposed to facilitate attention to technical components, error detection and correction, and progressive organization of the underhand-passing movement (Sidaway et al., 2012). The expected outcome is improved movement execution and underhand-passing performance, followed by a greater proportion of students reaching the individual mastery criterion

(≥75 points) and the predefined classical-mastery target (≥85% of students). Because the present study did not directly measure perceived difficulty, confidence, motivation, practice repetitions, movement variability, or cognitive load, the pathway should be interpreted as a theoretically informed pedagogical proposition rather than a directly tested mediation mechanism.

Critical Review of Existing Evidence Research Gap, Novelty, and International Contribution Objectives and Hypotheses

MATERIALS AND METHODS

Study Design and Setting

Study Population and Analytical Unit

Reconstruction of Small-Sided Games Implementation

Table 1. Reconstructed Small-Sided Games (SSG) Formats and Training Characteristics Based on Official Training Documentation

SSG format	Pitch size	Players per side	Bouts/s ession	Bout duration	Work:rest	Rule constraint	Scoring constraint	Primary objective	Session s/week
4v4 + 2 neutral	30 × 24 m	4	4	2 min	2:1	2-touch in selected bouts	Mini-goals/target zone	Possession and combination play	2
5v5 + GK	36 × 30 m	5	4	2 min	2:1	3-touch in selected bouts	Goal + target-zone transition	Forward progression and transition	2
6v6 + GK	45 × 35 m	6	4	3 min	2:1	Free/3-touch	Normal goal + transition bonus	Attacking organisation and progression	2

At the programme level, the documented SSG frequency was approximately 2–3 sessions per week. Session-RPE was used by the coaching programme as an indicator of perceived training intensity where available. Heart-rate monitoring was not used as a mandatory measure of SSG exposure.

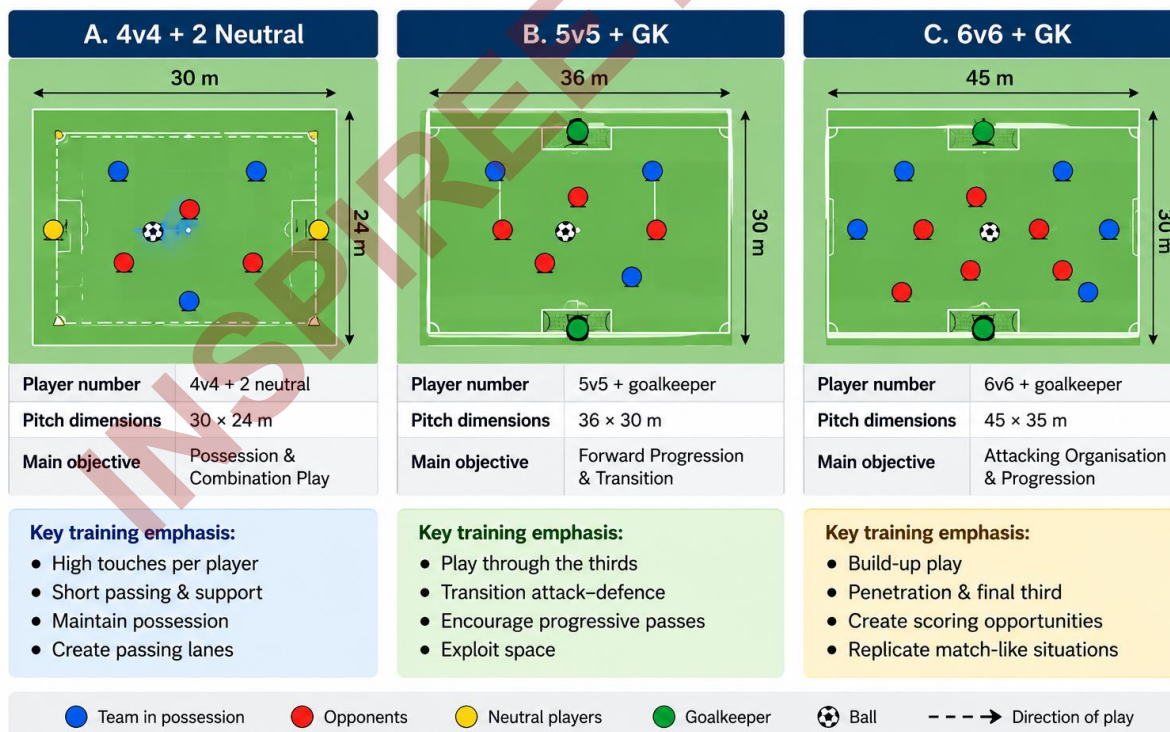


Figure 2. Small-Sided Game (SSG) Configurations Implemented in the Preparation Programme

The SSG activities were embedded within a broader preparation programme that also included passing and ball-control activities, transition play, attacking-unit activities, control games, physical preparation, psychological preparation, and friendly matches. These activities were not experimentally separated from SSG exposure and were therefore treated as contextual components of the overall preparation programme.

Competitive Match Data
Data Extraction and Coding Procedure
Measurement Reliability
Training-to-Competition Correspondence Framework
Statistical Analysis
Data Interpretation and Causal Boundaries
Ethical Approval

RESULTS

Study Population and Competitive Observations Documented Small-Sided Games Implementation

Coding Reliability Ball-Progression Performance Across Matches

Table 2. Match-level ball-progression performance across the three PON XXI matches

Indicator	Papua Pegunungan	West Java	Aceh	Mean $\pm$ SD
Ball possession (%)	34.00	47.00	31.00	37.33 $\pm$ 8.50
Passing accuracy (%)	72.87	69.19	63.46	68.51 $\pm$ 4.74
Attacking-third passes (n)	131	159	126	138.67 $\pm$ 17.79
Successful attacking-third passes (n)	89	115	80	94.67 $\pm$ 18.18
Successful progressive passes (n)	40	19	37	32.00 $\pm$ 11.36
Chances created (n)	7	2	7	5.33 $\pm$ 2.89
Progressive passing	Present	Present	Present	3/3
Through passes	Present	Present	Present	3/3
Match result	Win (2–1)	Win (1–0)	Win (3–2)	3/3 wins

Note. Mean and SD are descriptive summaries across three match-level observations and should not be interpreted as player-level estimates.



Figure 3. Match-Level Ball-Progression Profile Across Three PON XXI Matches.

Values represent match-level observations for the East Java Provincial Football Team against Papua Pegunungan, West Java, and Aceh. Indicators include ball possession, passing accuracy, successful progressive passes, successful attacking-third passes, and chances created. The figure provides descriptive comparisons

across the three matches and should not be interpreted as evidence of statistical association or causal effectiveness.

Match-to-Match Variation

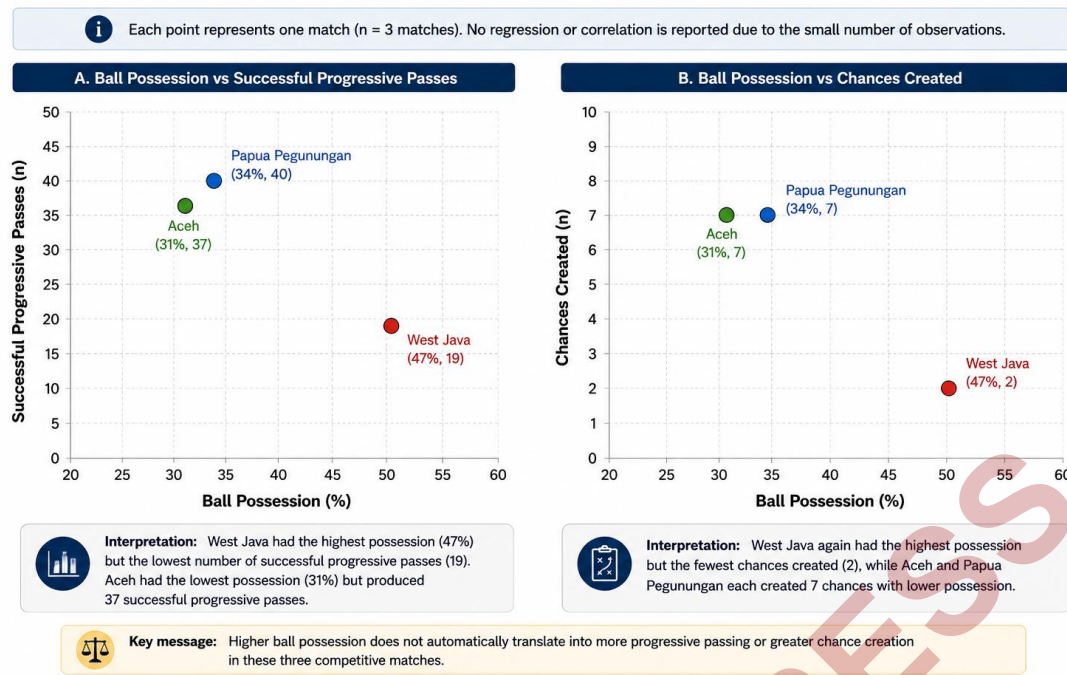


Figure 4. Relationship Between Ball Possession and Selected Ball-Progression Indicators

Each point represents one match-level observation from the East Java Provincial Football Team during PON XXI 2024 (n = 3 matches). The panels show ball possession in relation to successful progressive passes and chances created. The figure is intended for descriptive comparison only; no correlation or

regression analysis was performed because of the limited number of match-level observations.

Correspondence Between SSG Characteristics and Competitive Performance

Table 3. Correspondence between documented SSG characteristics and competitive performance

Documented SSG characteristic	Competitive indicator	Observed evidence	Interpretation
Passing and ball-control activities	Passing accuracy; attacking-third passing	Passing accuracy 63.46–72.87%; successful attacking-third passes 80–115	Descriptive correspondence
Transition play	Successful progressive passing	19–40 successful progressive passes; present in 3/3 matches	Descriptive correspondence
Control games	Progressive passing; through passes	Both patterns present in 3/3 matches	Descriptive correspondence
Attacking organisation	Attacking-third passing; chance creation	80–115 successful attacking-third passes; 2–7 chances created	Descriptive correspondence
Player-number modification	Decision-making opportunities	Documented across SSG formats	Conceptual correspondence
Playing-area modification	Spatial and temporal constraints	30 × 24 m, 36 × 30 m, and 45 × 35 m formats	Conceptual correspondence

The correspondence analysis indicates that the technical and tactical themes represented in the SSG programme were accompanied by relevant competitive performance patterns. In particular, transition-oriented SSG activities were documented alongside the repeated occurrence of successful progressive passing, while attacking-oriented game-based activities were accompanied by attacking-third passing and chance creation. However, these findings represent observational correspondence rather than evidence of a direct training effect. SSG exposure was not quantified at the individual-player level, and the broader preparation programme also included other technical, tactical,

physical, psychological, control-game, and friendly-match activities.

Summary of Main Findings

These descriptive patterns indicate that possession percentage alone did not adequately represent the team's ball-progression performance. The results support the use of complementary progression indicators when examining the competitive expression of game-based training characteristics.

DISCUSSION

Principal Findings

Interpretation of Ball Progression Under Different Possession Conditions

Relationship Between SSG Design and Competitive Expression

Training-to-Competition Transfer and Representative Learning

Comparison With Previous Research Theoretical and Practical Implications Strengths and Limitations

CONCLUSION

This study examined the correspondence between naturally implemented small-sided games (SSGs) within the East Java Provincial Football Team's preparation programme and competitive ball-progression performance during the 2024 National Sports Week (PON XXI). The findings indicate that the documented SSG programme incorporated systematic manipulation of player numbers, playing area, game rules, scoring constraints, bout structure, and tactical objectives, with training activities emphasising possession, transition, attacking organisation, and forward progression.

Across the three analysed official matches, progressive passing and through passing were consistently observed, while successful progressive passes, attacking-third passing, and chance creation were maintained across different possession conditions and competitive contexts. Notably, the team demonstrated substantial forward progression despite relatively low possession in two matches. The highest-possession match did not produce the highest number of successful progressive passes or chances created, indicating that possession volume alone does not adequately characterise competitive ball-progression performance in this case.

The findings provide descriptive evidence of ecological correspondence between the characteristics embedded in the team's game-based preparation programme and the forward-oriented behaviours observed during official competition. In particular, the repeated occurrence of progressive passing across all three matches is consistent with the programme's emphasis on transition, attacking organisation, and progression-oriented game-based activities. The high inter-rater and intra-rater reliability of the performance coding further supports the consistency of the competitive-performance observations.

However, the findings should not be interpreted as evidence that SSG implementation caused improvements in ball

progression. The study involved one elite provincial team and only three match-level observations, while individual SSG exposure was not quantitatively linked to individual competitive performance. In addition, SSGs were embedded within a broader preparation programme involving technical, tactical, physical, psychological, control-game, and friendly-match activities. Therefore, the study does not establish a causal effect, statistical contribution, or optimal SSG prescription.

The principal contribution of this study is methodological and ecological: it demonstrates how naturally occurring game-based training characteristics can be examined alongside official competitive-performance data to investigate potential training-to-competition correspondence in an elite football environment. The findings support the use of progressive passing, attacking-third passing, through passing, and chance creation alongside possession when monitoring competitive attacking performance.

Future research should employ prospective, longitudinal, and multi-team designs with quantified player-level SSG exposure and substantially larger competitive datasets. Integrating tracking, positional, technical, and contextual variables would also allow researchers to investigate the mechanisms through which representative game-based training may influence competitive ball progression.

Overall, the present case suggests that representative SSG-based preparation was consistently accompanied by forward-oriented competitive behaviours in the East Java team during PON XXI. The findings are promising from an applied performance-analysis perspective, but stronger conclusions regarding the effectiveness of SSGs require controlled and quantitatively linked longitudinal evidence.

DECLARATIONS

Ethical Approval
Consent to Participate
Consent for Publication
Author Contributions (CRediT)
Funding

Conflict of Interest
Data Availability
Acknowledgements
Generative AI Disclosure

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