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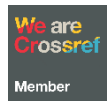
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Analysis of students' soccer shooting based on strength, coordination, and concentration

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ABSTRACT

This study aimed to conduct a needs analysis for developing a football shooting training program by profiling lower-limb explosive power, foot-eye coordination, and concentration among extracurricular football students at SMKN 1 Sijunjung. Thirty students with at least six months of regular training participated in purposive sampling. Explosive power was assessed using the Vertical Jump Test, coordination with the Foot-Eye Coordination Test, concentration with the Grid Concentration Test, and shooting ability with a standardized shooting test. Data were analyzed descriptively, using normative categorization, gap analysis, and a Need Priority Index (NPI) to identify training priorities. Results showed most students scored low across lower-limb power (63%), coordination (58%), concentration (71%), and shooting ability (68%), with the largest gaps in concentration, explosive power, and coordination. The NPI indicated a structured, progressive training approach prioritizing mental focus, neuromuscular power, and coordination before technical shooting development. These findings provide empirical guidance for targeted, evidence-based interventions in youth football training.



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Introduction

Shooting is one of the most decisive technical components in football because the quality of execution directly affects goal-scoring opportunities in every match. In the context of youth player development, shooting ability reflects not only basic technical skills but also a player's readiness to handle real game situations that require speed and accuracy in decision-making (Rösch et al., 2021; Silva et al., 2021).

At SMKN 1 Sijunjung, documentation shows that the extracurricular football team has experienced minimal performance improvement for over fifteen years, particularly in finishing, which remains low in accuracy, power, and precision during local competitions. This persistent underperformance indicates a clear performance gap that requires objective mapping through structured assessment of technical abilities (Manjunath et al., 2019; Mittal et al., 2019).

Research suggests that weaknesses in shooting technique among young players are often linked to underdeveloped biomotor foundations and inadequate coordinative abilities (Fauzi et al., 2022; Jawad

et al., 2021). Consequently, coaches cannot rely solely on repetitive technical drills without strengthening the fundamental physical and coordinative capacities that support shooting effectiveness (Artikov, 2025; Lindsay & Spittle, 2024).

Explosive power of the lower limbs plays a critical role in generating ball speed and strike force, making it a significant predictor of finishing effectiveness in modern football (Gherghel et al., 2021; Goranovic et al., 2021). Foot-eye coordination is essential for controlling shot direction accurately, particularly under game-induced pressure (Alficandra et al., 2021; Jufrianis et al., 2024; Yunita et al., 2022). Concentration also has a major influence, as players must maintain stable focus and minimize both internal and external distractions during shooting (Mappaompo et al., 2022; Sarhan, 2025).

Despite numerous studies on explosive power, coordination, concentration, and shooting performance, most research has focused on correlations or causal relationships between variables, rather than exploring the specific needs of players in a practical context. This leaves coaches without a clear picture of actual performance gaps or development priorities (Mahendra & Suwandi, 2022).

Needs analysis offers a solution by systematically identifying discrepancies between current abilities and ideal performance, and determining which areas require priority intervention (Roh & Kim, 2021). Studies show that needs analysis is effective in designing training programs that are adaptive, individualized, and data-driven, leading to more measurable improvements (Arianto & Setiawan, 2023; Mendez et al., 2020).

Given the long-term stagnation in the performance of the SMKN 1 Sijunjung extracurricular team, applying a needs analysis approach becomes highly relevant. Mapping the profiles of lower-limb explosive power, foot-eye coordination, and concentration provides an empirical foundation for developing a shooting training program that aligns with students' actual conditions.

This study contributes novelty by integrating these three fundamental components into a single needs analysis framework to guide the formulation of a shooting training program. Positioned at the pre-intervention stage, the research emphasizes performance gap identification to inform systematic, contextual, and applicable training interventions tailored to the specific needs of extracurricular football students at SMKN 1 Sijunjung.

Method

This study employed a descriptive-quantitative approach aimed at mapping the actual condition of players' fundamental abilities prior to developing a football shooting training program. This approach was chosen to provide a comprehensive overview of performance characteristics related to shooting ability (Awda, 2025; Labarrete, 2019; Lee et al., 2023). A needs analysis model was applied to identify the gap between players' current abilities and the ideal competencies required for effective shooting execution (Nopianto et al., 2021). This design focused on collecting objective data across physical, coordinative, and psychological domains to inform evidence-based training recommendations (Markaki et al., 2021).

The research subjects consisted of 30 students actively participating in the football extracurricular program at SMKN 1 Sijunjung, selected purposively based on a minimum of six months of regular training and basic football skill familiarity. Participants' age ranged from 15 to 18 years, representing the school's target population for training development. All participants were informed about research procedures, screened for health readiness, and provided consent before testing to ensure ethical and reliable data collection.

Four standardized instruments were used to assess the key components influencing shooting ability. Lower-limb explosive power was measured using the Vertical Jump Test, which has documented validity and reliability in sports science. Foot-eye coordination was evaluated through the Foot-Eye Coordination Test, assessing integration of visual input and motor responses. Concentration was measured using the Grid Concentration Test, which examines attentional focus and stability. Shooting ability was assessed with a standardized target-based shooting test. All tests were conducted

under controlled conditions, including consistent warm-up, rest periods, and testing environment, to minimize external variability.

Data analysis followed a structured three-stage process. First, performance was categorized using normative standards with defined thresholds for low, medium, and high performance. Second, gap analysis calculated the discrepancy between actual scores and ideal performance benchmarks, allowing identification of the most critical areas requiring intervention. Third, the Need Priority Index (NPI) was calculated for each variable using the formula: $NPI = (\text{Gap Magnitude} \times \text{Performance Weight}) / \text{Total Weight}$, enabling objective ranking of training priorities. This quantitative approach ensured that recommendations were evidence-based, systematic, and aligned with the players' actual needs.

All procedures maintained ethical standards, and instruments were selected based on established reliability and validity in football research to ensure accuracy and replicability of the findings.

Results and Discussions

Profile of Explosive Power, Coordination, Concentration, and Shooting Ability

An initial descriptive analysis was conducted to illustrate the basic ability levels of the students before determining their training needs. The results show that most students fall into the low category across all performance variables measured. This condition indicates that the players' biomotor, coordinative, and psychological readiness has not yet supported optimal shooting quality. The generally low performance profile across components demonstrates a mismatch between the technical demands of shooting and the players' foundational capacities. These data serve as an important basis before conducting a gap analysis against the required performance standards. Overall, the findings highlight the need for more targeted training interventions that address the players' actual needs.

Table 1. Students' Performance Profile by Variable

Variable	Low Category	Medium Category	High Category
Lower-Limb Explosive Power	63%	27%	10%
Foot-Eye Coordination	58%	32%	10%
Concentration	71%	21%	8%
Shooting Ability	68%	24%	8%

Table 1 shows that all performance variables fall into the low category at proportions above 50%, indicating dominant weaknesses in the players' physical, coordinative, and psychological aspects. Concentration has the highest proportion in the low category at 71%, suggesting that mental factors are the most significant issues affecting shooting execution. Meanwhile, lower-limb explosive power and shooting ability also show substantial low percentages, indicating the need to improve explosiveness and fundamental kicking technique. Foot-eye coordination, at 58% in the low category, shows that ball-control skills have not yet developed optimally. The combination of these four variables results in shooting performance that does not meet ideal standards. These findings confirm that training must begin by strengthening the players' foundational abilities. Overall, the table demonstrates that the players require comprehensive development rather than technical shooting practice alone.

The dominance of low-category scores across all variables reinforces the essential role of concentration, explosive power, and coordination in supporting shooting performance. As highlighted by Bull et al. (2023), concentration governs a player's ability to filter distractions and execute accurate technical actions under pressure, aligning with the high proportion of low concentration found in this study. Weak explosive power similarly limits ball velocity and shot effectiveness, supporting findings from Drouzas et al. (2020) indicating that insufficient lower-limb power significantly reduces shot force and stability. Furthermore, the low foot-eye coordination scores reflect underdeveloped sensorimotor integration, consistent with studies showing that coordination training is crucial for improving directional accuracy (Alficandra et al., 2021; Roberts et al., 2017). Taken together, the performance profile suggests that the players' foundational abilities are not yet adequate to meet the

technical demands of competitive-level shooting, thus requiring structured interventions across mental, physical, and coordinative domains.

Gap Analysis Results

A gap analysis was conducted to determine the discrepancy between the players' actual abilities and the ideal standards required for effective shooting. This approach is essential because it identifies which aspects are farthest from optimal performance targets. The results indicate that all variables exhibit considerable gaps, with concentration emerging as the one requiring the most attention. Explosive power and coordination also show significant discrepancies, meaning performance improvement cannot rely solely on technical training. By observing the magnitude of gaps across variables, coaches can establish priorities in developing a training program. This analysis supports the formulation of more effective interventions based on the players' real weaknesses.

Table 2. Gap Analysis Results

Variable	Actual Performance	Ideal Standard	Gap Magnitude	Gap Category
Concentration	Low (71%)	High (100%)	29%	High
Lower-Limb Explosive Power	Low (63%)	High (100%)	37%	Medium to High
Foot-Eye Coordination	Low (58%)	High (100%)	42%	Medium
Shooting Ability	Low (68%)	High (100%)	32%	Medium to High

Table 2 illustrates that concentration has the largest gap when compared to the ideal performance standard. This finding indicates that mental aspects are the most critical components influencing shooting quality. Lower-limb explosive power and shooting ability show similar gap magnitudes in the medium-high range, highlighting the need for focused improvement in these variables as well. Foot-eye coordination shows a medium-level gap, yet still requires attention as it is directly related to directional accuracy. The size of the gaps across variables demonstrates that the players do not yet meet competitive performance demands. Therefore, performance enhancement must be carried out gradually based on the urgency of each variable. This table provides an objective basis for determining intervention priorities through the development of the NPI.

The large performance gap in concentration aligns with research showing that attentional stability is a decisive factor in executing accurate shooting under match pressure (Ibrahim et al., 2024; Tassi et al., 2023). Similarly, the considerable gap in lower-limb explosive power supports biomechanical evidence stating that inadequate power restricts both shot force and postural control during follow-through (Drouzas et al., 2020). The moderate gap in foot-eye coordination also supports findings from youth training studies showing that coordination deficits hinder precision and ball-control efficiency (Andrade-lara et al., 2025; Bergmann et al., 2024). Combined, these gaps verify that weaknesses in foundational abilities not merely shooting technique are the limiting factors in player performance. Thus, the gap analysis confirms the necessity of structured, evidence-based interventions targeting mental readiness, neuromuscular power, and sensorimotor integration before advanced shooting training can be effective.

Training Needs Priority (Need Priority Index – NPI)

After conducting the gap analysis, the next step was to establish the priority order of training needs using the Need Priority Index (NPI). This approach enables the identification of which variables should be improved first during the training process. The analysis results show that concentration is the top priority because it has the largest gap and directly affects shooting stability. Lower-limb explosive power ranks second due to its strong contribution to shot force. Foot-eye coordination is placed next in priority, while shooting ability is positioned at the integrative stage as part of comprehensive technical development. This prioritization ensures that the training program is designed systematically and efficiently.

Table 3. Training Needs Priority Based on NPI

Rank	Variable	Priority Rationale	Main Direction	Intervention
1	Concentration	Highest gap; major influence on accuracy	Focus training, visualization, attention control	
2	Lower-Limb Explosive Power	Determines shot power	Plyometrics, bounding, squat jumps	
3	Foot–Eye Coordination	Influences directional accuracy	Ladder drills, ball coordination, repetitive drill	
4	Shooting Ability	Integrative technical outcome	Game-based	shooting, situational training

Table 3 shows that concentration is the highest priority variable because it has the largest performance gap and directly influences shooting execution. Mental-focus interventions therefore need to be applied more intensively to improve players' performance under match conditions. Lower-limb explosive power ranks second because shooting force is heavily dependent on explosive capability. Foot–eye coordination, ranked third, highlights the need for consistent ball-control and coordination training. Shooting ability is placed as the fourth priority because its improvement depends on progress in the previous variables. Therefore, coaches should structure training progressively, starting from foundational components and moving toward technical execution. This priority table provides clear guidance for developing a training program that aligns with the players' actual needs.

The prioritization outlined in the NPI is consistent with contemporary training models emphasizing multi-component development for complex skills such as shooting (Abdi et al., 2025). Concentration as the top priority aligns with evidence that external-focus strategies and visualization significantly boost accuracy under competitive stress (Bull et al., 2023; Candra, 2020). The placement of lower-limb explosive power as the second priority reflects the essential role of plyometric-based adaptations in increasing ball velocity and shooting distance (Drouzas et al., 2020; Moeskops et al., 2019). Foot–eye coordination, positioned third, is supported by findings showing that sensorimotor variability training effectively enhances technical precision (Alficandra et al., 2021; Ren et al., 2025). By placing shooting ability as the final integrative component, the NPI reinforces that technical execution improves most effectively when its foundational physical, cognitive, and coordinative components have been strengthened. This structured prioritization therefore supports the creation of a systematic, periodized training program for SMKN 1 Sijunjung players.

Conclusions

The findings of this study indicate that improving students' shooting ability must be grounded in a comprehensive understanding of performance needs that encompass mental, biomotor, and coordinative components. Concentration is shown to be the component with the largest performance gap, making mental-focus enhancement the primary priority in training program design. Lower-limb explosive power and foot–eye coordination also demonstrate significant gaps, highlighting the need for systematic interventions through plyometric training, dynamic coordination exercises, and reinforcement of fundamental techniques. Therefore, a shooting training program cannot stand alone; it must be designed integratively so that improvements in each foundational component can optimally transfer to shooting performance. This study provides an empirical basis for coaches to develop more targeted, relevant, and context-appropriate training programs for football extracurricular students at SMKN 1 Sijunjung.

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