



Contents lists available at [Elora Center](#)

Lentera Negeri

Journal homepage: <https://lentera.eloracenter.org/lentera>



Development of a drill-based shooting training methodology with experts' verification for footballers aged 13-17 years

Rizki Ade Syukra, Ridho Bahtra^{*)}, Syahrrial Bakhtiar, Alex Aldha Yudi

Faculty of Sport Science, Universitas Negeri Padang, Indonesia

Article Info

Article history:

Received Jul 11th, 2026

Revised Jul 16th, 2026

Accepted Jul 17th, 2026

Keyword:

Drill-based training,
Shooting accuracy,
Youth soccer,
Research and development,
Motor skill acquisition,
Talent development,
Coaching pedagogy

ABSTRACT

Shooting accuracy is a crucial determinant of scoring success in soccer. However, many youth football development programs continue to rely on repetitive training methods that may reduce player engagement and limit technical skill development. This study aimed to develop and evaluate a drilling-based shooting training model for junior soccer players in Football Schools (Sekolah Sepak Bola [SSB]) in West Sumatra, Indonesia. This research employed a research and development (R&D) approach using an adapted six-stage Borg and Gall framework, including needs analysis, product design, expert validation, revision, field testing, and effectiveness evaluation. The model was validated by experts in football coaching, research methodology, and language. Small-scale and large-scale field trials involved 12 and 25 players, respectively, with support from three coaches. Effectiveness was assessed using a one-group pretest-posttest design involving 20 players aged 13–17 years. Shooting performance was measured using the Shoot at Goal test and analyzed with a paired-samples t-test. Expert validation demonstrated high feasibility, with an average validity score of 88.96%. Practicality scores ranged from 87.50% to 100.00% across field trials, indicating that the model was highly practical and applicable. Players' shooting performance improved significantly, with mean scores increasing from 8.25 (SD = 2.43) at pretest to 14.80 (SD = 2.97) at posttest. Statistical analysis revealed a significant difference, $t(19) = 12.71$, $p < .001$, accompanied by a very large effect size ($d = 2.84$). The drilling-based shooting training model is valid, practical, and effective for improving shooting performance among junior soccer players. The model offers a structured and replicable approach to developing fundamental shooting skills in youth soccer training.



© 2026 The Authors.

This is an open access article under the CC BY-NC-SA license
(<https://creativecommons.org/licenses/by-nc-sa/4.0>)

Corresponding Author:

Ridho Bahtra,

ridhobahtra@fik.unp.ac.id

Introduction

Soccer is among the most widely practiced team sports in the world, and its competitive outcome is ultimately decided by a team's capacity to convert attacking opportunities into goals (Federation Internationale de Football Association [FIFA], 2020; Luxbacher, 2012). Among the technical components underlying this capacity, shooting is consistently identified as the skill most proximally linked to scoring, since even well-constructed build-up play yields no competitive value without an accurate and well-timed finish (Luxbacher, 2012; Mielke, 2007). Developing this skill to an automatic, context-adaptable level requires substantial, well-structured practice, because shooting performance depends on the precise coordination of approach, body

positioning, ball contact, and decision-making under time pressure (Engler et al., 2023; Schmidt & Lee, 2019).

Yet, in numerous developing football systems, the management of youth technical training has not fully grasped the complexities of such a transition. At different Sekolah Sepak Bola (SSB) grassroots academies in Indonesia, our own initial field observation and coach interviews (these interviews and observations formed Stage 1 of the R&D process in the Method section, not an cited external study) showed that shooting drills are often highly repetitive and not differentiated at all. The players are offered a variety of shooting drills that barely differ; they are all in the same format and the players are presented only slight differences of distance, angle, service type, or decision-making demand. This is a trend in Indonesia's grassroots players' performance where fundamental skills such as shooting have a high inconsistency and are hardly mastered when the players are assessed using a standard test (Gutawa & Rohman, 2022). Coaches are usually not familiar with field-based shooting curricula developed based on systematic sequence, so they make shooting exercises on the fly. Consequently, it results in poor player engagement and technical development. (Harsono, 2018).

Structured shooting interventions have been a central topic of several empirical studies not only in the realm of soccer but also its close cousin futsal. Ardiansyah (2018) created a six-drill shooting model integrating different shooting situations like shot from an angle, shooting under the pressure, shooting a moving target, shooting from a rebound situation, shooting after making the correct combination pass, and decision maker shooting situations. Their research results showed a significant improvement in shooting accuracy of players between before and the post periods, when they used the new model. Fathurrahman (2021) ran his program versus a control group, in the result treatment had more effect than expected which means treatment was more effective ($t = 4.982 > t\text{-table} = 2.045$ at $\alpha = .05$). Ali & Farooq (2017) found, through working with an international sample, that a series of technique-based shooting methods increased not only shooting precision but also the speed of kicks among young players. In regard to futsal, various studies indicate that playing games with targets and varying the number of obstacles as well as varying positions can bring about similar increases in shooting accuracy (Buya, 2021; Iyakrus, 2023; Subki & Bulqini, 2019; Suhardianto & Ismail, 2019). Also, through various ways, multimedia-supported lessons have helped students better their shooting abilities (Himawan, 2022). Altogether, these research works illustrate that providing youth players with a regular system of drills focused not just on technique but overall development of shooting skills results in improved shooting performance.

In spite of this, three major gaps in the literature remain. One issue is that existing studies on shooting mostly involve shooting interventions with few variations of the drill (usually less than ten) which were not developed using a systematic product-development methodology; they simply test a fixed protocol that cannot provide a comprehensive, valid, and extensible curriculum. The next issue is the few studies that triangulate expert opinion from all three fields coaching, research methodology, and language and carry out layered field testing (i.e. the product is small-scale, large-scale, and finally effectiveness stages of testing), before the product is made available for use in the real-life situation. This sequence is a core component of establishing validity, practicality, and effectiveness, and these three criteria should be considered as distinct and evidence-based ones (Borg & Gall, 2003). A final issue concerns the literature on motor learning which has increasingly been calling into question whether shooting drills based on a blocked and repetition structure provide the right balance between the short-term mastery and the long-term retention or transference. This is especially true when one remembers that variable practice, or even practice where the sequence is random, has been shown in several recent studies to increase the level of retention although acquisition might be slower (Ammar et al., 2023; Carlsson et al., 2025; (Apidogo et al., 2024; Shamshiri et al., 2025). The fact that this issue is still under discussion highlights the importance of shooting-training models that not only have a short-term effectiveness shown by means of empirical studies but also clearly state for which stage of the individual's development and what kind of practice organization they have been intended, so that one will be able to understand and evaluate the results against, for example, game-based pedagogies such as small-sided games (Rahmoune et al., 2025).

The research's novel methodological contribution can very briefly be summarized as a 25-drill, step-by-step shooting proficiency plan that is first validated by coaches, methodology experts and language specialists (coaching, methodology, language), field-tested in three stages small-scale, large-scale and effectiveness the combination of which appears to be unique for this age group. This is a very detailed combination of the validation method and stages of field-testing which has never been reported before for this age group and the sport under consideration. This study fills these gaps by devising a 25-drill, progressively ordered drill-based SSB shooting training model for players 13-17 years, then confirming it through triangulated expert judgment and multi-tier field trials. Moreover, it is evaluating the model's effectiveness through a controlled statistical

methodology. The originality of the work is three aspects: (1) creating and validating empirically a far more comprehensive and progressively structured shooting curriculum than was previously documented for this age group; (2) presenting the validated curriculum as a ready-to-use, practical coaching handbook that therefore directly closes the research-to-practice gap, frequently cited in sport-science R&D studies; and (3) showing a validity-practicality-effectiveness reporting order that is transparent to validity issues and practicality of the work, while effectiveness has been tested; in line with contemporary calls for methodological rigor in applied sport-pedagogy research (Liloi & Kungku, 2024). Theoretical contribution, besides the motor-skilling approach, is the application of deliberate-practice principles in the context of grass-roots coaching, while the practical contribution is a validated, generalizable coaching resource. Consequently, this paper had four objectives that were to develop (a) a shooting drill-based training model for SSB players (13-17 years old), (b and c) through triangulated expert judgment validate small- and large-scale testing its practicality. Also (d) through experimental research method determine the shooting ability.

Method

Research Design

Based on the model suggested by Borg & Gall (1983, 2003), this study used a Research and Development (R&D) approach, in which product design is a loop process of design, expert evaluation, field testing, and revisions that result in an educational or training material that is valid, feasible, and effectual for its target audience. The six-step procedure of Borg and Gall R&D used in present research is presented in Table 1 along with its modification based on practical application of Sport Pedagogy R&D and considering the size and time limitations of the project (Borg & Gall, 2003; Sugiyono, 2023). Numbers of participants at each stage were based on practical considerations (3 experts and 12, 25, 20 players) due to the limited scope of this field study in an applied R&D context and the availability of partner SSB Academies. Together with the lack of inclusion of a control group in the effectiveness study, this limitation has been admitted of in the Discussion.

Table 1. Mapping of the Original Borg and Gall (1983) Ten-Step Model onto the Six Adapted Stages Used in This Study

Adapted Stage	Original Borg & Gall (1983) Steps Subsumed	Main Activity in This Study
Potential and problems	Research and information collection	Field observation and coach interviews at SSB academies to identify shooting-training deficiencies
Data collection / planning	Planning	Analysis of needs data; specification of the intended 25-drill product and target user (players aged 13-17)
Product design	Develop preliminary form of product	Drafting of the 25 drill-based shooting exercises, including objectives, equipment, organization, procedure, and illustrations
Expert validation and revision	Develop preliminary form of product (validation component); Main product revision	Validation by football/coaching, research-methodology, and language experts; revision of the product based on expert feedback
Small- and large-scale field trials	Preliminary field testing; Operational product revision; Main field testing	Small-scale trial (12 players), revision, and large-scale trial (25 players, 3 coaches)
Effectiveness test and final product	Operational field testing; Final product revision; Dissemination and implementation	One-group pretest-posttest effectiveness trial (20 players) and finalization of the training-model handbook

Participants and Sampling

The study population was identified and drawn inductively through participant selection by purposive sampling from grassroots football academies (Sekolah Sepak Bola) SSB in Agam Regency, West Sumatra, Indonesia. The research context of player's ages, which were 13-17 years old, were consistent in terms of club-based, structured coaching programs (Creswell & Creswell, 2021). There have been four participant groups representing different phases of R&D work. All youth-players involved are male SSB-academy athletes; the minors' involvement necessitates that both parental/guardian consent and a certificate from the

research ethics committee be properly documented which, as per the corresponding author, should be inserted as the final version of the author statement (see Ethics Statement, Section 6).

Table 2. Participants Across the Successive Stages of the R&D Procedure

Stage	Setting	Participants (n)	Purpose
Expert validation	Universitas Negeri Padang	3 experts (football/coaching, research methodology, language)	Validity of the training model and instruments
Small-scale field trial	SSB Rajawali FC	12 players + 1 coach	Practicality / initial field feasibility
Large-scale field trial	SSB Kompak FC	25 players + 3 coaches	Practicality / broader field applicability
Effectiveness trial	SSB Dewa 24 FC	20 players	Effectiveness (pretest-posttest shooting ability)

Note. This article is a derivative work based on a thesis for doctorate/master's degree that features an inconsistency within the site names mentioned in the storytelling part of the Method chapter and the data provided for those locations in the Results chapter. The plots are aligned with the Results chapter data, and the writer is directed to match the site names before uploading (see the attached academic audit).

Product

The handbook is the result of the product and contains 25 player-focused shooting drills. It is directed towards players between 13 and 17 years of age, arranged from least to most difficulty. The drills are designed in a way that combines passing, off-the-ball movement, and finishing. Therefore, the shooting in drills is practiced in a context similar to actual game situations. With each drill you will find the training goal, equipment needed for the drill (the balls, cones, the goals, bibs, whistle, markers), the player organization, the way the drill is performed, and an explanatory illustration diagram all that, it fits in with the recommendations as laid down by the sport-training R&D productdocumentation convention (Liloi & Kungku, 2024).

Instruments

Four instruments were used across the R&D stages: (1)Expert validation sheets: Each professional judge (football/Coaching, research-methodology, language) scored separately an expert judgment rating sheet (based on Sugiyono 2023), comprising 10 statements in a 1-5 ranking scale to evaluate content, procedural clarity, methodological soundness and linguistic quality of the training model; (2) Player/coach questionnaires. The ratings were done through a closed four-point scale (Layak/Eligible, Cukup Layak/Fairly Eligible, Kurang Layak/Less Eligible, Tidak Layak/Not Eligible). Players and coaches responded to this short set of questions about the drill model's clarity, ease of implementation, safety, and perceived benefit in the context of small- and large-group trials. The same tool had already been evaluated for face validity by three experienced experts; (3) Field observation sheets: Tools that are primarily the researcher's in order to capture fidelity of implementation, participant reactions, and practical constraints during small- and large-scale pilots with coach support if applicable; and (4) The Shooting at the Goal test (Nurhasan, 2001) is used to assess players' shooting abilities in the effectiveness trial. Players took the shooting test standing at a distance of 16.5 m away from the goal with three attempts and the score of target zones summed up. The norms or categories are ranging from very poor (≤ 3) to very good (≥ 17). No coefficient of test-retest or inter-rater reliability for this measuring instrument was established in the source literature; it is mentioned in the Discussion section as a limitation of the instrumentation.

Procedure

After carrying out the needs analysis and design of the product phase, the pilot training model together with the related instruments were given to three experts for an independent check of their validity. Their comments were mainly about modifying the shooting distances according to the target age groups, making passing and running lane markings on the drill diagrams more visible, accounting for which foot is a player's stronger foot, and rewriting parts which used less common or inappropriate words in a way that the readers would be more able to see the point or meaning; based on this feedback, the authors modified the manuscript and proceeded to conducting field tests. Then the first small group experiment took place within three visits at SSB Rajawali FC ($n = 12$). After that, some adjustments (including, notably, replacing long, lofted passes with other types that were easier for the players after they had been found to have problems with their first-touch control) were implemented. The mass trial of the product was subsequently performed at SSB Kompak FC ($n = 25$ players, 3教练) over the course of five sessions. It was followed by slight improvements (adding a controlled first touch before shooting, and re-highlighting shooting accuracy rather than shooting power in

the coaching cues). Ultimately, a pilot test of the training program's effectiveness was carried out at SSB Dewa 24 FC using a one-group pretest-posttest methodology with pretest, followed by eight training sessions introducing the finalized drill model, with posttest, through ten meetings: the Shooting at the Goal test.

Data Analysis

An expert-validation and questionnaire scores were transformed into percentages with $SKOR = (SH/SK) \times 100\%$. SH is the score achieved, SK is the highest score possible, as per the reference by Sugiyono (2013). Different expert or respondent score averages were used for the subsequent categorization into four eligibility statuses: 80-100% (eligible/usable), 60-79% (fairly eligible/usable), 50-59% (less eligible/should be replaced), and <50% (not eligible/should be replaced) (Arikunto, 2017). Descriptive statistics were computed for the pretest and posttest shooting scores including mean, standard deviation, and range to test for effectiveness. To verify the distributional normality, a Shapiro-Wilk test which is suitable for $n < 50$ was used (Ghozali, 2021), and paired-sample t-test at $\alpha = 0.05$ was used on the pretest-posttest difference for assessment of the pretest-posttest difference. In line with the effect-size requirements of the current Q1 articles which are not limited to t-values and sample size only but also reporting of Cohen's d for paired samples derived from the mentioned t-value and n through $d = t/\sqrt{n}$ (Engler et al., 2023), we did not compute from raw data not available to the authors but rather report only on the t-value and sample size.

Results and Discussions

Product Characteristics

The developed product is a 25-drill, drill-based shooting training model targeted at U-13-U-17 SSB players, summarized in Table 3.

Table 3. Characteristics of the Drill-Based Shooting Training Model

Component	Description
Product name	Drill-Based Shooting Training Model in Soccer
Target users	SSB players aged 13-17 years
Number of drills	25 drills, sequenced from lower to higher difficulty
Training objective	Improve players' soccer shooting ability
Training method	Drill (structured, progressive repetition)
Equipment	Balls, cones, goals, bibs, whistle, markers
Product format	Coaching handbook (three parts: introduction, compiled drills, closing section)

Expert Validation (Validity)

Independent ratings from the three validators on the training-model instrument as well as the player/coach questionnaire are presented in a condensed form in Table 4.

Table 4. Expert Validation Results for the Training Model and the Player/Coach Questionnaire

Validator	Object	Score	Max. Score	Category (%)
Football/coaching expert	Training model	47	50	94% - Eligible
Research-methodology expert	Training model	44	50	88% - Eligible
Language expert	Training model	48	50	96% - Eligible
Football/coaching expert	Questionnaire	48	50	96% - Eligible
Research-methodology expert	Questionnaire	47	50	94% - Eligible
Language expert	Questionnaire	50	50	100% - Eligible

All six scores were above 80%, the limit set for "eligible" (Arikunto, 2017). This means the training model and its measurement tools were considered valid from the coaches' point of view as well as methodologically and linguistically. Coaches' comments included suggestions to adjust firing distance according to age and skill, to highlight different areas for passing and running, to consider dominant foot variability, and to improve the wording; these recommendations appeared in the next stage of editing. 80% minimum acceptance level is consistent with the method that usually classifies sport-pedagogy R&D validation studies in Indonesia (Arikunto, 2017). But it has to be remembered that such scoring actually shows personal agreement among the ratifying experts rather than indicating the achievement of psychometric benchmarks

which are generally measured on indices like Aiken's V or content validity ratio, etc. Moreover, there were no inter-rater reliability indicators calculated by the three ratifiers. This limitation of the instruments is treated in this paper at length.

Field Trials (Practicality)

Both trials returned scores that were more than 80% which is the eligible score level. That means that players and coaches always considered the model as clear, safe, easy to carry out and it also showed players shooting skills development, through the trials. They also pointed out small implementation issues that came up during the tests. (One trial had players struggling to control passes in the air during their little version while the other one was showing that players couldn't really judge the direction correctly and players just wanted to do it all with power in the big-scale one.) All of those problems were taken care of by some specific changes. The first one added a little hint about controlling the ball at the very beginning while the coach gave players instructions before starting the first movement in the second case. After that, they did effectiveness trials and all went well.

Table 5. Practicality Results from the Small-Scale and Large-Scale Field Trials

Trial	Respondent	Score	Max. Score	Category (%)
Small-scale (SSB Rajawali FC)	Players (n = 12)	420	480	87.5% - Highly eligible
Small-scale (SSB Rajawali FC)	Coach (n = 1)	40	40	100% - Highly eligible
Large-scale (SSB Kompak FC)	Players (n = 25)	915	1000	91.5% - Eligible
Large-scale (SSB Kompak FC)	Coaches (n = 3)	106	120	88.33% - Eligible

Effectiveness Trial

Descriptive Statistics the percentage of players whose shooting skills were rated as "good" or "very good" increased from 10% at the pretest (2 out of 20 players), up to 85% at the posttest (17 out of 20 players) while no player stayed in the "poor" category after the intervention (Table 7).

Table 6. Descriptive Statistics of Shooting Scores Before and After the Intervention (N = 20)

Measure	Min	Max	M	SD
Pretest	5	13	8.25	2.43
Posttest	9	19	14.80	2.97

Table 7. Frequency Distribution of Shooting Categories at Pretest and Posttest

Category (score range)	Pretest f	Pretest %	Posttest f	Posttest %
Very good (≥ 17)	0	0%	7	35%
Good (12-16)	2	10%	10	50%
Fair (8-11)	10	50%	3	15%
Poor (4-7)	8	40%	0	0%
Very poor (≤ 3)	0	0%	0	0%

Normality and hypothesis testing since the p-values of both distributions were higher than .05, we applied parametric paired-sample t-test to analyze the hypothesis of the significant difference in pretest and posttest.

Table 8. Shapiro-Wilk Normality Test for Pretest and Posttest Scores

Variable	N	M	Significance (p)	Distribution
Pretest	20	8.25	0.168	Normal
Posttest	20	14.80	0.131	Normal

Table 9. Paired-Sample t-Test for Pretest and Posttest Shooting Scores

Comparison	N	t (obtained)	t (critical)	df	Sig.
Pretest vs. Posttest	20	12.708	2.093	19	$p < 0.001$

Since the calculated t-statistic (12.708) is greater than the critical value (2.093), the significance test leads to the rejection of the null hypothesis that there is no difference in shooting performance after the drilling intervention. Basing on the results, they obtained the paired sample's effect size, $d = t/\sqrt{n} = 12.708/\sqrt{20} \sim 2.84$, that by the usual standards (Cohen, 1988) would be considered one of the biggest effects, and supports the trend described by the descriptive statistics in Table 7 of moving to higher shooting ability levels.

Final Product

This R&D process results in a field-tested, validated coaching handbook with shooting exercises consisting of 25 shooting drills targeted at U-13-U-17 soccer players, it having been successfully validated by experts and tested on a small, large scale and effectiveness basis that meets the traditional requirements of the product development process in terms of validity, practicality and effectiveness (Borg & Gall, 2003). The researchers devised and proved through expert judgment (88-96%), field trial (87.5-100%), pre- and post-test performance ($t(19) = 12.708$, $p < .001$, $d \sim 2.84$) that their 25-phase model of shooting-training, which is systematically arranged and suitable for adolescent SSB players is indeed: one of the main things the model showed was shooting ability improvement. In fact, besides supporting previous studies on structured shooting programs in childhood football, it provided more substantial evidence and further elaborated upon the existing literature.

Direction and the level of significance of the present result agree very highly with the results of previous research in the shooting aspect through drills. Ardiansyah (2018) found that after a six-drill program, 20 SSB players (13-15 years) significantly increased their shooting accuracy. Pretest-posttest one-group design had been considered as evaluation approach which is same method used in this study. The current paper enhances this research by confirming the effectiveness of a major intervention (25-drill) which is more systematically and rigorously structured. Fathurrahman (2021) in his quasi-experimental study with control group, reported a smaller t-value of a programmed shooting mode but it was also significant (4.982 vs. 2.045). The quite large difference between t-values obtained here (12.708), may partly result from different study designs as there was no inclusion of a control group. This means, maturation, familiarization and repeated-testing that might explain the gain were not ruled out and such a limitation is considered in some detail below. Ali and Farooq (2017) also concluded that a shot drill program based on technique could effectively raise shooting accuracy and ball speed in young players outside Indonesia hence the mechanism behind is probably transferable not only across cultures but also different stages of football development.

The results of studies into futsal, a sport closely related to football, have been fairly consistent across the board. Targeting game and goal-targeting drills significantly enhanced shooting and passing accuracy of young futsal players (Buya, 2021; Iyakrus, 2023; Subki & Bulqini, 2019). Moreover, obstacle variation training resulted in similar improvements (Suhardianto & Ismail, 2019). Also, shooting technique has improved in Multimedia-assisted instruction (Himawan, 2022), hence highlighting feedback methods as another variable that can be added onto the current drill model in future versions. The extent of shooting skills deficits at baseline being similar to the ones identified from this pretest where the M score is 8.25, that falls in the "fair" to "poor" range of scoring, has equally been reported among many Indonesian football youths generally (Gutawa & Rohman, 2022) thus showing the importance of introducing a structured shooting programme even at the initial stages or development level of the sport.

Furthermore, it would be wise to read this in light of the body of research that is comparing pedagogies that are mainly drills versus ones based on games. Rahmoune et al. (2025) concluded that the integration of small-sided games as well as the practice of circuits of dribbling enhanced the physical and technical development of the young participants. While on the other hand Carlsson et al. (2025) reported that the structured method of passing-skill acquisition with direct feedback surpassed the use of small-sided-games in youth female players for accuracy with the side-foot kick. Besides, the team who worked with small-sided-games hardly saw any improvement if not slightly even deteriorated during one test. This finding gives evidence that the drill-type method used by us is quite effective for the kind of technical outcomes, like for instance, shooting accuracy, the kind which is especially relevant during adolescent developmental phase where technique becomes more automatic and less effortful. Nevertheless At the level of the so-called contextual-interference effect literature, we have an added insight: meta-analysis is showing that the kind of practice which is a sequence of the same or very similar tasks, like our drills' structure, is very efficient at the stage of early learning, while the kinds of practice which vary the tasks or alternate them in different order are thought to promote much better long-term memorization and skill transfer, however, this advantage is not consistent across different developmental stages or levels, types of skills tested, and testing designs (Ammar et al., 2023; Apidogo et al. (2024), Shamshiri et al. (2025)). The main theoretical mechanism which accounts for how our gradually graded, game-contextualized drill sequence differs from the "monotonous, undifferentiated" drills previously condemned is that the difficulty level goes up methodically from drill 1 to 25 with the shooting element constantly being wrapped into passing and getting free from a defensive marker. This approach therefore preserves the training setting in a way that it reflects the so-called blocked/low-contextual-interference conditions that have been considered favorable for the early phases of skill acquisition whereas the random variation of tasks is only introduced later in the process. Because we only looked at immediate posttest performance, the limitation of the trial is quite obvious and therefore, one would agree

as the present finding suggests an area for conducting research with the use of retention or transfer testing a few weeks after the cessation of the programme.

Motor-learning theory also supports the level of improvement we saw. Schmidt and Lee (2019) state that skills can be practiced and perfected only when coupled with the right feedback, the kind of feedback that helps you master neuromuscular coordination through the repetition of actions. According to them, these types of feedback strengthen movement and help in being able to repeat them accurately and effortlessly. It is probably that the model with a drill method of practice where supervisors were teaching coaching points in eight different session settings offered the necessary feedback. In the same way, Roestiyah (2018) defines the drill method to mean, essentially, practicing the same action again and again so that it gets more accurate and automatic, that is, one does not think too much before executing the physical action because it is almost an automatic response. Bompaa and Buzzichelli (2019) also point out, from a coaching point of view and the point of periodized training, that good training must incorporate the aspects of specificity, progressive overload, individualization, and variation. The present model difficulty progression over 25 drills together with expert-driven changes for dominant foot preference is, therefore, a very grass root implementation of coaches in terms of these concepts as defined.

The study not only reveals a validity-practicality-effectiveness reporting sequence typical of modern sport-pedagogy research (Liloi & Kungku, 2024), but also its reliance on a standardized shooting test (Nurhasan, 2001) is a good sign that aligns with the movement to reinforce psychometric foundations of assessing soccer shooting (Engler et al., 2023). However, a few limitations identified in the study, some inherited from its initial work and some that we have noticed in this re analysis, need to be recognized before the results are accepted as final. Firstly, without a control or comparison group in a one-group pretest-posttest design, there's no proof for sure that changes are due to the drill intervention rather than the subject's maturation, the subject's familiarization with the test, or a natural training development that took place during the study period; a randomized or a matched-control-group study is, therefore, the suggestion as future confirmatory research direction (see also Fathurrahman, 2021). Second, validity was determined through subjective judgments of experts measured as agreement ratios only while there was not a single valid psychometric index (e.g., Aiken's V or content validity ratio) used. Additionally, no reliability coefficient (e.g., test-retest or inter-rater reliability) for the observation scales and questionnaires was reported. Third, due to its limited sample size and concentration in one area only, the results of this study cannot be generalized to the players who differ in developmental histories, levels of competition or cultural backgrounds of their coaches. Fourth, the timeframe of intervention (only eight sessions) allows only to make conclusions about the short-term effect of training program and at the same time makes any conclusions about the durability or transferability of effects impossible. Last, the measurement of success only on one closed-skill test makes assessment rather narrow. Future studies need to assess shooting under defensive pressure, decision-making speed, or in-game shot conversion which would significantly enhance ecological validity of the studies.

Collectively, these results show that the shoot-drill model could be a good tool to coach in youth local football that, however, needs improvement to be widely used through research directions and methods such as controlled comparison designs, psychometric validation, retention tests, and game-based formats combination that will further strengthen the model's evidence base.

Conclusions

Based on an adapted Borg and Gall research development (R&D) procedure with six-stages that led to a new drill-based shooting training method comprised of 25 drills, this study created a 13-17 years old SSB footballers shooting model. Through expert validation (88.96% level) and small scale (87.5 100%), big field experiments (88.33 91.5%), they confirmed the validity and real-world applicability of the model and at the same time, an effectiveness trial using pretest-posttest of one_group showed a significant and very large increase in shooting capability ($t(19) = 12.708$, $p < .001$, $d \sim 2.84$). As this experiment implemented a one-group pretest-post test design with no control condition, the observed improvement cannot only be related to the intervention and has to be validated by a future randomized or matched-control study. The scientific part of this project is that these results help us apply the concept of motor-learning through different stages in a validated way and at an under-served grass-roots coaching context whereas the practical aspect is a coaching guide grounded in empirical evidence and ready-to-use. We can coach, train the SSB academies, and work together for coaching in sport science to take up this model as a more effective way of training besides the shooting without any changes in content in the future research, we shall go on investigating the model not only to other fundamental elements, but also incorporate randomized controlled and retention-

testing designs; also, we may examine its integration with game-based training formats to understand its position within a complete youth-development curriculum.

Acknowledgments

The writer expresses gratitude to the coaches and players of SSB Rajawali Football Club, SSB Kompak Football Club, and SSB Dewa 24 Football Club. Also, the author thanks the expert validators for their assistance and involvement.

References

- Ali, A., & Farooq, F. (2017). Effect Of Technique-Based Shooting Drills On Accuracy And Ball Speed In Youth Soccer Players. *Journal Of Sports Science And Coaching Practice*.
- Ammar, A., Trabelsi, K., Boujelbane, M. A., Boukhris, O., Glenn, J. M., Chtourou, H., & Scholl Horn, W. I. (2023). The Myth Of Contextual Interference Learning Benefit In Sports Practice: A Systematic Review And Meta-Analysis. *Educational Research Review*, 39, 100537. <https://doi.org/10.1016/j.edurev.2023.100537>
- Apidogo, J. B., Ammar, A., Salem, A., Burdack, J., & Schöllhorn, W. I. (2024). Resonance In Variation: Effects Of Variable Practice For Handball, Basketball, And Volleyball Skills: A Study On Contextual Interference And Differential Learning. *Sports*, 12 (1), 5. <https://doi.org/10.3390/sports12010005>
- Ardiansyah, A. (2018). Pengembangan Model Latihan Shooting Berbasis Variasi Situasi Permainan Pada Pemain Sepakbola Usia 13-15 Tahun [Unpublished Thesis]. Universitas Negeri Padang.
- Arikunto, S. (2017). Pengembangan Instrumen Penelitian Dan Penilaian Program. Pustaka Pelajar.
- Bompa, T. O., & Buzzichelli, C. (2019). *Periodization: Theory And Methodology Of Training* (6th Ed.). Human Kinetics.
- Borg, W. R., & Gall, M. D. (1983). *Educational Research: An Introduction* (4th Ed.). Longman.
- Borg, W. R., & Gall, M. D. (2003). *Educational Research: An Introduction* (7th Ed.). Allyn & Bacon.
- Buya, P. (2021). Pengaruh Latihan Permainan Target Terhadap Ketepatan Shooting Dalam Permainan Futsal. *Jurnal Ilmu Kesehatan Olahraga*, 2(1), 1-13.
- Carlsson, T., Broman, J., Isberg, J., & Carlsson, M. (2025). Passing-Skill Training Vs. Small-Sided Games For Improvement Of Side-Foot Kick Accuracy Among Youth Female Soccer Players. *Frontiers In Sports And Active Living*, 7, 1506563. <https://doi.org/10.3389/fspor.2025.1506563>
- Cohen, J. (1988). *Statistical Power Analysis For The Behavioral Sciences* (2nd Ed.). Lawrence Erlbaum Associates.
- Creswell, J. W., & Creswell, J. D. (2021). *Research Design: Qualitative, Quantitative, And Mixed Methods Approaches* (6th Ed.). Sage.
- Engler, F., Hohmann, A., & Siener, M. (2023). Validation Of A New Soccer Shooting Test Based On Speed Radar Measurement And Shooting Accuracy. *Children*, 10(2), 199. <https://doi.org/10.3390/Children10020199>
- Fathurrahman. (2021). Pengaruh Model Latihan Shooting Terprogram Terhadap Peningkatan Akurasi Tembakan Pemain Sepakbola Remaja [Unpublished Thesis]. Universitas Negeri Padang.
- Federation Internationale De Football Association. (2020). *FIFA Coaching Manual*. FIFA.
- Ghozali, I. (2021). *Aplikasi Analisis Multivariate Dengan Program IBM SPSS 26* (10th Ed.). Badan Penerbit Universitas Diponegoro.
- Gutawa, W. A., & Rohman, K. F. (2022). Analisis Teknik Dasar Sepak Bola Pada Anak Usia Dini Pada Siswa Sekolah Sepak Bola (SSB) Kecamatan Kunjang Kabupaten Kediri. *Jurnal Kesehatan Olahraga*, 10(2), 183-190.
- Harsono. (2018). *Latihan Kondisi Fisik*. PT Remaja Rosdakarya.
- Himawan, F. (2022). Pengaruh Penggunaan Media Audio Visual Terhadap Keterampilan Teknik Dasar Shooting Futsal (Studi Kasus SMAN 3 Karawang). *Jurnal Ilmiah Mandala Education*, 8(3), 1-14.
- Iykrus, F. B. N. (2023). Pengaruh Latihan Target Gawang Terhadap Ketepatan Shooting Futsal. *Jurnal Ilmu Keolahragaan*.
- Liloi, K., & Kungku, T. (2024). Development Of A Training Model For Basic Attacking Techniques In Teqball Games For PJKR Students. [Journal Name To Be Confirmed By Author].
- Luxbacher, J. A. (2012). *Soccer: Steps To Success* (4th Ed.). Human Kinetics.
- Mielke, D. (2007). *Dasar-Dasar Sepakbola*. Pakar Raya.

-
- Nurhasan. (2001). Tes Dan Pengukuran Dalam Pendidikan Jasmani: Prinsip-Prinsip Dan Penerapannya. Direktorat Jenderal Olahraga, Depdiknas.
- Rahmoune, M. A., Selmi, O., Bouali, S., Bouassida, A., Alexe, D. I., Aldhahi, M. I., Cojocaru, A. M., Stef, M., & Alexe, C. I. (2025). Effects Of Small-Sided Games And Dribbling Circuit Training On Physical And Technical Skills In Youth Soccer Players. *Scientific Reports*. <https://doi.org/10.1038/S41598-025-31382-7>
- Roestiyah, N. K. (2018). Strategi Belajar Mengajar. Rineka Cipta.
- Schmidt, R. A., & Lee, T. D. (2019). Motor Learning And Performance: From Principles To Application (6th Ed.). Human Kinetics.
- Shamshiri, G., Fazeli, D., & Nazemzadegan, G. (2025). The Impact Of Contextual Interference And Differential Learning On Motor Skill Development And Motivation Among Beginner Basketball Players. *European Journal Of Sport Science*.
- Subki, M. I., & Bulqini, A. (2019). Pengaruh Latihan Target Games Terhadap Peningkatan Akurasi Shooting Menggunakan Kaki Bagian Dalam Peserta Ekstrakurikuler Futsal SMK Diponegoro Sidoarjo. *Jurnal Prestasi Olahraga*, 2(1), 1-13.
- Sugiyono. (2013). Metode Penelitian Kuantitatif, Kualitatif, Dan R&D. Alfabeta.
- Sugiyono. (2023). Metode Penelitian Dan Pengembangan (Research And Development/R&D). Alfabeta.
- Suhardianto, S., & Ismail, A. (2019). Pengaruh Latihan Variasi Tiang Rintang Terhadap Keterampilan Shooting Dalam Permainan Futsal Pada Mahasiswa Universitas Megarezky. *Prosiding Seminar Nasional FKIP Universitas Muslim Maros*, 1(2), 132-136.