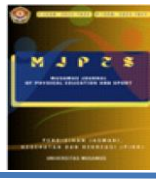
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Development of a Traditional Game-Based Football Learning Model to Improve Elementary School Students' Motor Skills

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Abstract

Objectives: This study developed and evaluated a traditional game-based football learning model intended to improve the motor skills of elementary school students at SD Inpres Nggarorandi.

Materials and Methods: A research and development design followed the five ADDIE phases: analysis, design, development, implementation, and evaluation. Participants were 36 students aged 10–12 years, one physical education teacher, and three expert validators. The product comprised eight football learning activities adapted from traditional games. Evidence of product quality was obtained from expert-validation forms, teacher and student practicality questionnaires, implementation-fidelity records, and a motor-skill assessment covering locomotor, object-control, and balance/stability domains. Pretest–posttest change was examined with a paired-samples t-test ($\alpha = .05$), and effect magnitude was expressed as Cohen's d_z.

Results: The model achieved an overall expert-validity score of 92.3%. Practicality was 94.6% according to the teacher and 91.8% according to students, while implementation fidelity reached 93.7%. Total motor-skill scores increased from 63.72 ± 8.45 at pretest to 82.58 ± 7.21 at posttest, $t(35) = 12.84$, $p < .001$, $d_z = 2.14$. Significant improvements were also observed in locomotor, object-control, and balance/stability scores (all $p < .001$).

Conclusions: The traditional game-based football learning model demonstrated high validity, practicality, implementation fidelity, and preliminary effectiveness for improving elementary school students' motor skills. The model offers a culturally responsive way to connect local play traditions with football-related learning tasks; however, controlled studies with larger samples are needed before causal and generalizable claims can be made.

Keywords: elementary physical education; football; fundamental movement skills; motor competence; traditional games

Introduction

Motor competence in childhood provides the foundation for participation in games, sport, and sustained physical activity. Fundamental movement skills are commonly organized into locomotor, object-control, and stability domains, and their development is not assumed to occur automatically without appropriate instruction and practice. Developmental evidence suggests that motor competence, perceived competence, physical activity, fitness, and weight status interact over time, making the elementary-school years an important period for structured movement learning (Stodden et al., 2008). Systematic reviews likewise associate higher

fundamental movement-skill competence with physical activity and several health-related outcomes (Lubans et al., 2010; Barnett et al., 2016). More recent school-based evidence indicates that locomotor and object-control competence is positively related to moderate-to-vigorous physical activity during recess and physical education lessons (Liu et al., 2024).

Physical education can provide deliberate, developmentally appropriate practice, yet conventional instruction may become overly technique-centered and insufficiently connected to children's lived experiences. Active-play interventions have shown potential to improve movement skills, particularly when activities are structured and guided (Johnstone et al., 2018). Traditional games are especially promising because they combine repeated movement practice with familiar rules, peer interaction, enjoyment, and cultural meaning. In Indonesian elementary-school settings, traditional games such as bebentengan, galasin, and other locally recognized forms of play can be adapted to elicit running, dodging, balancing, passing, receiving, and target-directed actions.

Prior studies support this pedagogical direction. An eight-week traditional-games intervention improved fundamental movement skills among Indonesian elementary-school students (Supriadi et al., 2019). Fauzi et al. (2023) reported improved fundamental motor skills and participation after implementing bebentengan and boy-boyan in elementary physical education. Aliriad et al. (2024) also found positive changes in motor skills and motivation following traditional-game activities. Beyond Indonesia, practice with traditional cultural games enhanced acquisition, retention, and transfer of gross motor skills among primary-school children, with practice order influencing learning outcomes (Hussain & Cheong, 2022).

Football provides an appropriate movement context for such integration because it requires locomotor actions, dynamic balance, spatial adjustment, and object control. A systematic review and meta-analysis concluded that football practice can improve several components of children's fundamental movement skills, particularly object control, sprinting, jumping, and balance, although effects vary by program duration, age, and sex (Mao et al., 2022). However, limited development research has systematically translated local traditional games into a validated, practical football-learning product for elementary schools in Bima. Therefore, this study aimed to develop and evaluate a traditional game-based football learning model for improving the motor skills of students at SD Inpres Nggarorandi. The product was evaluated in terms of validity, practicality, implementation fidelity, and preliminary pretest–posttest effectiveness.

Materials and Methods

Research Design and Setting

This research used a research and development approach based on the ADDIE model: Analysis, Design, Development, Implementation, and Evaluation. The study was conducted from January to April 2026 at SD Inpres Nggarorandi, Bima Regency, West Nusa Tenggara, Indonesia. The development process was intended to produce a school-usable learning model and to obtain preliminary evidence of its content quality, usability, implementation, and effectiveness.

Participants

The needs analysis involved 36 Grade V and VI students and one physical education teacher. Three validators participated in the development review: one physical education learning expert, one football coaching expert, and one learning-media expert. A small-group trial involved 12 students, after which the

revised model was implemented in a field trial involving all 36 students. The field-trial sample comprised 20 boys (55.6%) and 16 girls (44.4%), with a mean age of 11.2 ± 0.8 years.

Development Procedures

During the Analysis phase, the researchers identified learner characteristics, instructional needs, school conditions, and locally familiar games. During Design, football-related motor objectives were mapped onto the movement demands and social structures of selected traditional games. During Development, activity instructions, rules, equipment, safety provisions, and progression were drafted and reviewed by experts. The product was revised in response to validator feedback and then tested with a small group. During Implementation, the revised model was used in the field trial. During Evaluation, validation, practicality, fidelity, and motor-skill outcomes were analyzed to judge product quality and identify further revisions.

Table 1. Components of the traditional game-based football learning model

No.	Learning activity	Traditional-game basis	Primary target
1	Zig-zag dribbling	Gobak sodor	Agility and dribbling
2	Passing challenge	Bentengan	Passing accuracy
3	Ball relay race	Traditional relay	Coordination
4	Circle passing	Ular naga	Passing and receiving
5	Target kick	Lempar kaleng	Kicking accuracy
6	Speed dribble	Chasing game	Speed and ball control
7	Team attack	Modified bentengan	Teamwork and decision-making
8	Mini-football game	Combined games	Application in play

Instruments

Expert-validation forms evaluated content relevance, alignment with learning objectives, developmental appropriateness, clarity and feasibility, and safety. Teacher and student questionnaires assessed the practicality of instructions, organization, equipment, time use, enjoyment, and ease of implementation. Implementation fidelity was recorded as the proportion of planned components delivered during the field trial.

Motor skills were assessed with a study-specific, modified gross-motor instrument covering locomotor skills, object-control skills, and balance/stability. The instrument yielded domain scores and a total score. The internal-consistency coefficient reported for the instrument was Cronbach's $\alpha = .89$. Because the source document did not provide the item-level protocol, scoring criteria, assessor training, or inter-rater agreement, these details should be added from the original research records before submission.

Data Analysis

Validation, practicality, and fidelity data were summarized as percentages and interpreted using the categories applied in the development study. Motor outcomes were summarized as means and standard deviations. The Shapiro–Wilk test was specified to examine the normality of paired differences. Pretest–posttest changes were assessed using paired-samples t-tests in SPSS version 27 at $\alpha = .05$. For internal consistency with the paired design, Cohen's d_z was calculated as $t/\sqrt{n}$; values of approximately 0.20, 0.50, and 0.80 were interpreted as small, moderate, and large, respectively.

Results

Participant Characteristics

Table 2. Characteristics of the field-trial participants

Characteristic	Field trial (n = 36)
Age, years	11.2 ± 0.8
Boys	20 (55.6%)
Girls	16 (44.4%)
Baseline motor score	63.72 ± 8.45

Expert Validation

The overall expert-validation score was 92.3%, categorized as very valid. All assessed dimensions exceeded 90%, with content relevance receiving the highest score (94.0%) and clarity and feasibility the lowest (90.8%).

Table 3. Expert-validation results

Dimension	Score (%)	Category
Content relevance	94.0	Very valid
Learning objectives	91.0	Very valid
Developmental appropriateness	93.5	Very valid
Clarity and feasibility	90.8	Very valid
Safety	92.2	Very valid
Overall	92.3	Very valid

Practicality and Implementation Fidelity

The teacher practicality score was 94.6%, and the student practicality score was 91.8%; both were classified as very practical. Implementation fidelity across the field-trial sessions reached 93.7%, indicating that most planned learning components were delivered.

Table 4. Practicality results

Respondent	Score (%)	Category
Physical education teacher	94.6	Very practical
Students	91.8	Very practical

Pretest–Posttest Motor Outcomes

Total motor-skill scores increased by 18.86 points, from 63.72 ± 8.45 at pretest to 82.58 ± 7.21 at posttest. The paired-samples test indicated a statistically significant improvement, $t(35) = 12.84$, $p < .001$, $d_z = 2.14$. Significant gains were also observed in locomotor, object-control, and balance/stability domains, each with a large paired effect size.

Table 5. Changes in motor-skill outcomes

Outcome	Pretest M ± SD	Posttest M ± SD	t(35)	p	d_z
Total motor skill	63.72 ± 8.45	82.58 ± 7.21	12.84	< .001	2.14
Locomotor skill	21.34 ± 3.12	27.86 ± 2.95	9.71	< .001	1.62
Object control	24.15 ± 3.88	31.22 ± 3.11	10.23	< .001	1.71
Balance/stability	18.23 ± 2.76	23.50 ± 2.18	8.94	< .001	1.49

Note. $d_z = t/\sqrt{n}$ for paired observations (n = 36).

Discussion

This study produced an eight-activity football learning model that combined football-related tasks with the movement patterns and social organization of locally familiar traditional games. The principal findings were that experts rated the product as very valid, teachers and students rated it as very practical, implementation fidelity was high, and motor-skill scores improved substantially after implementation. The model's novelty lies in its systematic mapping of traditional play structures onto football-specific learning goals while retaining locomotor, object-control, balance, cooperation, and decision-making demands within a single elementary physical education product.

The pretest–posttest improvement is consistent with earlier studies of traditional-game interventions. Supriadi et al. (2019) found that eight weeks of games including galasin, gatrik, bebentengan, and kasti significantly improved elementary students' fundamental movement skills. Fauzi et al. (2023) similarly reported gains in fundamental motor skills and participation following a program based on bebentengan and boy-boyan. Aliriad et al. (2024) extended this evidence by showing that traditional games can improve motor learning and motivation. These convergent findings suggest that traditional games provide repeated, meaningful opportunities to run, change direction, balance, coordinate with peers, and manipulate objects rather than isolating skills from a recognizable play context.

The present results also align with international evidence. Hussain and Cheong (2022) showed that traditional cultural game skills improved acquisition and transfer of gross motor skills among children aged 7–10 years, while also demonstrating that practice organization influences learning. The current model's variety of dribbling, passing, chasing, relay, target, and team tasks may have created contextual variation that encouraged children to adapt movements across changing situations. This interpretation is compatible with active-play evidence indicating that guided and structured play can support motor-skill development (Johnstone et al., 2018).

The integration of football content provides a second plausible explanation. Football practice exposes children to acceleration, deceleration, directional change, balance, visual scanning, and repeated lower-limb object control. Mao et al. (2022) found positive effects of football practice on several fundamental movement outcomes, particularly object control, sprinting, jumping, and balance. In the present study, improvements occurred across object control, locomotor, and balance/stability, which is coherent with the multi-domain demands of the eight activities. Nevertheless, the magnitude of change should be interpreted cautiously because the field trial did not include a comparison group, and novelty, maturation, repeated testing, or ordinary physical education exposure may have contributed to the observed gains.

High practicality and fidelity support the model's feasibility in a real school context. Cultural familiarity may reduce the time needed to explain activity logic, while inexpensive equipment and recognizable group structures may help teachers organize lessons. This contextual relevance matters because culturally responsive physical education connects learning to students' identities and prior experiences. The model therefore contributes not only a set of games but also a development procedure through which local play can be translated into explicit football and motor-learning objectives.

The findings have practical implications for elementary physical education. Teachers can use traditional games as task frameworks, then modify space, group size, rules, targets, and ball constraints to emphasize specific motor outcomes. Progression should remain developmentally appropriate, maximize active practice,

and include safety checks and concise feedback. The model should be considered a supplementary instructional option rather than a replacement for systematic skill instruction, because children still benefit from explicit demonstrations, opportunities for correction, and planned progression.

Several limitations constrain interpretation. First, the one-group pretest–posttest design cannot establish causality. Second, the sample came from one school and was small, limiting generalizability. Third, the source document did not provide the intervention dose, detailed scoring protocol, inter-rater reliability, or raw data needed to independently verify assumptions and effect estimates. Fourth, practicality responses may be influenced by social-desirability and novelty effects. Future research should use a cluster-randomized or controlled design, prespecified primary outcomes, blinded or independently trained assessors, follow-up testing for retention, and samples from multiple schools. Process data on enjoyment, physical activity intensity, cultural engagement, and implementation barriers would clarify how and for whom the model works.

Conclusions

The ADDIE-based traditional game–football learning model demonstrated high expert validity, teacher and student practicality, and implementation fidelity. Students' locomotor, object-control, balance/stability, and total motor scores improved significantly from pretest to posttest, with large paired effect sizes. These findings provide preliminary support for a culturally responsive approach that connects local traditional games with football learning in elementary physical education. Because the study used a single-group field trial, the results should be treated as developmental and preliminary; controlled, multisite research is required to confirm effectiveness and generalizability.

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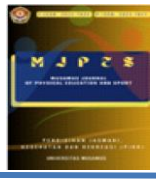
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