

**Improving Locomotor Skills Through the Bentengan Traditional Game
Based on Living Values Education**Rika Fauziyah Saprudin¹, Rahmad Khodari^{2*}, Auliya Aenul Hayati³¹²³ Primary School Teacher Education, Swadaya Gunung Jati University, Cirebon, Indonesia**Keywords**

Bentengan
traditional game;
locomotor skills;
Living Values
Education;

Abstract

This study aims to test the effectiveness of the Bentengan traditional game, based on Living Values Education (LVE), in improving the locomotor skills of Year 4 pupils at SDN Kanggraksan. A mixed-methods approach with an explanatory sequential design was employed. The quantitative component used a quasi-experimental One Group Pre-test-Post-test design involving 28 pupils. Locomotor skills were measured using the TGMD-2 locomotor subtest, whilst LVE value internalisation was observed using a structured observation sheet. The intervention consisted of 4 sessions (2×35 minutes). Quantitative analysis included the Wilcoxon Signed-Rank Test and N-Gain; qualitative analysis utilised the Miles & Huberman model. Results showed an increase in average locomotor skills from 22.29 to 37.79 (69.57% gain), with a highly significant difference ($Z = -4.631$; $p < 0.001$). The average N-Gain was 0.60 (moderate to high) and all students improved. Qualitative data revealed that LVE value internalisation (cooperation, responsibility, respect) occurred progressively, with observation scores developing from 22/60 (Insufficient) to 59/60 (Very Good). The Bentengan traditional game based on LVE is effective in improving locomotor skills whilst internalising character values, recommended as a holistic approach for Physical Education teachers.

✉ Corresponding author:
E-mail: Rahmad.khodari@ugj.ac.id

INTRODUCTION

Primary school is a golden age for children's motor, cognitive, social and moral development that cannot be repeated. However, the COVID-19 pandemic has had a significant impact on pupils' motor skills. Data collected during the pandemic showed that only 32% of Year 3 and 4 primary school pupils had reached the mature stage in locomotor skills, whilst 54% were still in the transitional stage and 14% in the early stage (Yuniar & Hambali, 2023). This situation has persisted post-pandemic; another study concluded that pupils' locomotor skills generally remain at the transitional stage (Nuryadi, 2024). These findings serve as a serious warning sign for the Indonesian physical education sector, given that mastery of mature locomotor skills is a strong predictor of the adoption of an active and healthy lifestyle throughout life (Zulfikar, 2021).

Physical education in primary schools plays a fundamental role in the holistic development of pupils, encompassing the psychomotor, cognitive and affective dimensions in an integrated manner (Purkonudin, 2022). In the international literature, values-based physical education is viewed as an approach that targets not only physical fitness but also character building and social competence (Bailey, 2009). This focus on character development is reinforced nationally through the Character Education Strengthening Programme (PPK), which aligns with Ki Hajar Dewantara's vision of harmonising the cultivation of the heart, emotions, mind, and body (Susanto, 2024). In the context of the 21st century, physical education is required to produce not only individuals who are physically healthy and skilled, but also members of society with strong character who are collaborative and adaptable (Budiman, 2024).

One of the key focuses of physical education in primary schools is the development of Fundamental Movement Skills (FMS), which form the foundation for children's subsequent motor development (Ropi & Kardani, 2021). International longitudinal research confirms that mastery of FMS in childhood is strongly correlated with engagement in physical activity later in life and the adoption of a healthy, active lifestyle (Lubans, 2010). Gallahue, Ozmun, and Goodway (2012) categorise FMS into three groups: stability, locomotor, and manipulative skills, the development of which occurs across three stages: the initial stage, the elementary stage, and the mature stage. Among the FMS categories, locomotor skills—including running, hopping on one foot, jumping with both feet, leaping, galloping, and sliding—occupy a vital position as the foundation for more complex sporting abilities. Standardised measurement of locomotor skills is carried out using the Test of Gross Motor Development-Second Edition (TGMD-2), developed by Ulrich (2000) and internationally recognised as a valid and reliable instrument for children aged 3–10 years (Rahma Wati & Rezki, 2025). Unfortunately, national studies indicate that pupils' basic locomotor skills have generally not developed optimally and require serious intervention (Mubin & Rustandi, 2021).

This situation is exacerbated by two widespread phenomena: firstly, excessive reliance on digital devices, which is shifting children's activity patterns towards more passive and individualistic behaviour (Riadi & Lestari, 2021); secondly, a sedentary lifestyle, which means that the WHO's recommendation for at least 60 minutes of moderate-to-vigorous physical activity per day for children aged 5–17 is often not met (Gumilang, 2023), leading to a decline in children's physical fitness levels, motor skills, and participation in physical activity (Ramdhan, 2024).

Traditional Indonesian games offer contextual solutions. In the international literature, a game-based approach (game-based learning) in physical education has been shown to significantly increase students' intrinsic motivation and active engagement compared to conventional drills (Harvey & Jarrett, 2014). Traditional games are not merely recreational activities, but cultural expressions rich in philosophical, social, and educational values (Butarbutar, 2024). From a pedagogical perspective, traditional games are highly relevant to the cognitive development stage of primary school children (Piaget's concrete operational stage), where children learn most effectively through direct experience and meaningful activities (Mustaqimah, 2024). Games such as Gobak Sodor, Engklek, and Bentengan have been shown to effectively develop gross motor skills through dynamic movements whilst honing social skills such as cooperation, communication, and responsibility (Nisa, 2025). Furthermore,

traditional games embody philosophical values rich in character-building and serve as a vital foundation for shaping individuals with a strong sense of self who are prepared to face global challenges (Hayati & Kurniawan, 2020). In line with this, the implementation of traditional games in physical education has been shown to strengthen the character of primary school pupils, including values such as tolerance, respect for differences, and adherence to rules (Nurfajariyah, 2024).

Among these various traditional games, Bentengan was selected as the primary intervention medium as it offers an ideal integrated learning package. From a motor skills perspective, the dynamics of Bentengan naturally train the full spectrum of locomotor skills: running with speed and endurance are dominant elements in chasing and evasion; jumping with both feet and taking long strides occur when players avoid being tagged or secure strategic positions; whilst manoeuvres to outwit opponents train agility in dashing and shifting. Bentengan has been shown to improve 60-metre sprinting ability through acceleration and agility training (Nurhadi, 2025), and embodies character values aligned with the pillars of PPK: religiosity, nationalism, cooperation, independence, and integrity (Sholehatus, 2023).

A number of studies have confirmed the effectiveness of traditional games in the development of motor skills and character. Skipping has been shown to significantly improve gross motor skills, with improvements in the horizontal jump (38%) and hop (35%) components (Wijaya, 2025). Modified traditional games such as tin can throwing, hopscotch, and gobak sodor are capable of improving the fundamental movement skills of Year 1 primary school pupils by up to 46.5% (Triansyah & Gustian, 2020), whilst gobak sodor and bakiak have been shown to be effective in improving pupils' physical fitness (Setiawan, 2024). The game Hadang has also been shown to not only increase physical activity but also contribute to strengthening pupils' cognitive and affective aspects (Irawan, 2022). More generally, the effectiveness of traditional games in stimulating improvements in primary school pupils' motor skills is confirmed by a significant increase in average scores (Uray, 2021); indeed, a game-based learning approach through classroom action research has even been shown to improve gross motor skills in lower-year pupils by up to 92% (Purwanto, 2024). In terms of character, learning based on the traditional game of bakiak lari has been shown to significantly improve pupils' cooperative spirit in terms of cooperation and communication (Nur, 2022). However, these studies generally focus on motor or affective aspects separately, and character education still emerges as an implicit side effect without systematic design within a specific pedagogical framework.

This is where Living Values Education (LVE) offers a relevant theoretical and methodological framework. LVE is a character education programme designed to help children explore, develop and internalise twelve universal life values through direct experience and practical-reflective methods (Apriani & Mahilda, 2024). Unlike conventional approaches, which tend to be doctrinal, LVE emphasises the process of internalisation and experiential learning within a mutually respectful environment (Patimah & Herlambang, 2021). LVE has been proven effective in enhancing nationalism within PPK learning (Sunarno, 2023), promoting anti-bullying behaviour through the internalisation of values based on storybooks in primary schools (Inggaswana, 2025), preventing bullying behaviour through the internalisation of values (Seftiani, 2024), and developing students' intelligence in a multidimensional manner (Rozak, 2023). In the context of Physical Education, the integration of LVE is relevant because physical activity naturally provides a contextual platform for instilling values (Nuraini, 2024), where strategies such as teacher modelling, cooperative learning, and the consistent application of rules correlate significantly with improvements in students' sportsmanship (Naibaho, 2024). However, to date, no research has examined the application of LVE within the context of Physical Education whilst simultaneously measuring its impact on psychomotor outcomes.

This gap is clearly evident from initial observations in Year 4 at SDN Kanggraksan. The results revealed that the majority of pupils were unable to perform locomotor skills correctly. Approximately 29% of pupils did not demonstrate coordinated hand-foot movement whilst running, 32% experienced instability whilst running, and 36% struggled to perform controlled

deceleration as they approached the finish line. In the hop skill, around 43% of pupils struggled to maintain balance and coordination. In the jump skill, around 43% of pupils did not prepare correctly, meaning both knees were not bent and the arms were not extended straight behind the body. The leap skill showed that only 64% of pupils were able to perform the movement with a clear gliding phase. For the gallop, 39% of pupils did not demonstrate the correct movement pattern with the front foot consistently leading, whilst for the slide, 56% of pupils performed the movement incorrectly, such as crossing their legs or failing to turn their body sideways. These data indicate that pupils' basic movement abilities have not been adequately assessed, physical education has not optimally integrated motor skill development with the instilling of character values, and traditional games are rarely utilised in physical education despite their significant potential for development.

Consequently, no study has yet simultaneously integrated the Bentengan traditional game with the LVE pedagogical framework to measure the dual impact on improving locomotor skills and reinforcing the values of cooperation, responsibility, and respect in Physical Education. Based on this, this study aims to implement and test the effectiveness of physical activities through the Bentengan traditional game, integrated with LVE, in improving the locomotor skills of Year 4 pupils at SDN Kanggraksan. Theoretically, this study contributes to the development of values-based pedagogy within the context of play-based learning. In practical terms, the results of this study are expected to produce an innovative learning protocol for Physical Education teachers to improve locomotor skills whilst instilling the values of cooperation, responsibility, and respect, in order to optimise the holistic development of Indonesian children who are healthy, have strong character, and love their culture.

METHOD

This study employs a mixed-methods approach with an explanatory sequential design, wherein quantitative methods serve as the primary approach, followed by qualitative methods as a secondary approach to explain and deepen the understanding of the quantitative results obtained. In the quantitative component, the study used a quasi-experimental design with a One Group Pretest-Posttest Design ($O_1 \rightarrow X \rightarrow O_2$), where O_1 is the pretest of locomotor skills, X is the treatment in the form of LVE-based Bentengan games consisting of 4 sessions (2×35 minutes), and O_2 is the posttest of locomotor skills. In the qualitative component, the study employed structured naturalistic observation conducted throughout all treatment sessions to document the implementation process of the learning and the dynamics of value internalisation.

The study was conducted at SDN Kanggraksan. The study population comprised all Year 4 pupils, consisting of two classes with a total of 57 pupils aged 9–10 years. The study sample consisted of 28 pupils selected using purposive sampling based on criteria of good attendance and adequate physical condition, to ensure that subjects could consistently participate in the entire intervention programme. The independent variable in this study was Bentengan traditional game-based learning integrated with the Living Values Education (LVE) framework, whilst the dependent variable is the pupils' locomotor skills, comprising six components: running (run), galloping (gallop), hopping on one foot (hop), long jump (leap), horizontal jump (horizontal jump), and sliding (slide).

The study was conducted in three stages. The first stage involved preparation and a pre-test, comprising coordination with the school, preparation of instruments, training of raters, and the administration of the pre-test. The second stage involved the implementation of the intervention comprising four sessions, each structured as follows: an opening and values-based dynamic warm-up (15 minutes), the core activity of the Bentengan-LVE game (40 minutes), and a cool-down and values reflection (15 minutes). The third stage consisted of the post-test and the collection of supplementary data, following the same procedures as the pre-test.

This study utilised three data collection instruments. Firstly, the TGMD-2 (Test of Gross Motor Development Second Edition), developed by Dale Ulrich to assess the basic motor skills of primary school-aged children (Sulaeman, 2023). Each skill was observed across two trials, with a score of 1 if the criteria were met and 0 if not, yielding a maximum subscale score of 48 points for the locomotor subscale. As the study only utilised the locomotor subtest, the analysis employed the total raw scores from the pre-test and post-test. Second, a structured observation sheet

comprising four sections: (a) implementation observation, consisting of brief narrative descriptions focusing on how the teacher opened and closed the lesson, the methods used to facilitate the game, and the pupils' responses to each stage of the lesson; (b) observation of the manifestation of LVE values, in the form of a score of 1–4 for 15 behavioural indicators—five indicators each for respect, responsibility, and cooperation—reflecting the frequency and quality of the behaviours observed, with a maximum score of 60 and completed by the observer at each session; (c) observation of locomotor skills, involving the marking of a tick (✓) against six locomotor movements observed within the context of the games, accompanied by an estimate of their frequency of occurrence; and (d) observational conclusions, comprising a narrative synthesis completed after all sessions have concluded to record general patterns, developments, and significant findings throughout the intervention.

Prior to use, all observation sheets were validated by three validators: one lecturer and two Physical Education teachers. Validation was conducted across five assessment aspects— , content relevance, instrument construction, clarity of language and wording, representativeness of indicators, and practicality and feasibility—determined by the following criteria:

Table 1. Validation Criteria

Percentage	Level of Validity
85.01% – 100%	Highly valid, or can be used without revision
70.01% – 85%	Sufficiently valid, or can be used but requires minor revisions
50.01% – 70%	Not sufficiently valid; it is recommended that this not be used as it requires revision
01.00%–50%	Invalid, or should not be used

Table 2. Validation Results

Assessment Aspect	Validity Percentage			Average Percentage	Validity Level
	Validator 1	Validator 2	Validator 3		
Content Relevance	75	100%	92%	89%	Highly Valid
Instrument Construction	75%	100%	91%	89%	Highly Valid
Clarity of Language and Wording	81	92%	95%	89%	Highly Valid
Indicator Representation	92%	100%	100%	97%	Highly Valid
Practicality and Feasibility	92	90	92%	91%	Highly Valid

The validation results show that all instruments achieved a score percentage within the range of 85%–100%, and are therefore categorised as Highly Valid and can be used without revision.

Quantitative data analysis was conducted using descriptive statistics, the Shapiro-Wilk normality test ($n = 28$), hypothesis testing using the Paired Sample t-Test if the data were normally distributed or the Wilcoxon Signed-Rank Test if not, with a significance criterion of $p < 0.05$, and the calculation of N-Gain to measure the magnitude of the intervention's effectiveness, categorised as:

Table 3. N-Gain Categories

Percentage	Classification
$g > 0.7$	High
$0.3 \leq g \leq 0.7$	Moderate
$g < 0.3$	Low

Qualitative data analysis utilised the Miles & Huberman interactive model through data reduction, data presentation, and verification and conclusion-drawing via triangulation of sources from observations and field notes. In the final stage, the results of the quantitative and qualitative analyses were integrated to confirm, explain, and expand the meaning of the findings holistically.

RESULTS AND DISCUSSION

Locomotor skills were measured using the TGMD-2 (Test of Gross Motor Development—Second Edition) instrument on 28 Year 4 pupils at SDN Kanggraksan. This instrument assesses six components of locomotor movement: run, gallop, hop, leap, horizontal jump, and slide, with a maximum score of 48 points. The descriptive statistical results are presented in **Table 4** below.

Table 4. Descriptive Statistics of Locomotor Skill Scores

Variable	N	Min	Max	Mean (SD)
Pre-test score	28	17	33	22.29 (3.276)
Post-test score	28	33	42	37.79 (2.630)
Difference (gain)	-	-	-	15.50

Based on Table 4, the mean pretest score of 22.29 (SD = 3.276) increased to 37.79 (SD = 2.630) in the posttest, with an average difference of 15.50 points or an increase of 69.57% from the initial condition. A particularly significant finding is that the minimum post-test score (33) exceeded the maximum pre-test score (33), indicating that all students without exception showed an improvement. Furthermore, the smaller post-test standard deviation indicates a more homogeneous distribution of students' abilities following the intervention. When broken down by movement component, the greatest improvement occurred in the horizontal jump (gain of 4.03 points; 50.4% of the maximum score) and the run (gain of 3.64 points; 45.5%), as shown in **Table 5**.

Table 5. Average Score Improvements per Locomotor Movement

Movement	Max	Pre-test	Post-test	Gain (points)	% of Max
Run	8	2.43	6.07	3.64	45.5%
Gallop	8	4.00	6.00	2.00	25.0%
Hops	10	5.64	7.54	1.90	19.0%
Leap	6	1.93	4.71	2.78	46.3%
Horizontal Jump	8	1.43	5.46	4.03	50.4%
Slide	8	6.86	8.00	1.14	14.3%
Total	48	22.29	37.79	15.50	32.3

In the pre-test, the horizontal jump (mean 1.43/8) and leap (1.93/6) components were the movements that the pupils had the least mastery of, whereas the slide was already relatively good (6.86/8). After the intervention, the two movements that were initially the weakest actually

showed the highest improvement, indicating that the intervention had the greatest impact precisely on the components with the greatest deficit.

Prior to hypothesis testing, a Shapiro-Wilk normality test was conducted given the relatively small sample size ($n = 28$). The test results are presented in **Table 6**.

Table 6. Results of the Shapiro-Wilk Normality Test

Data	Shapiro-Wilk W	Sig.	Notes
Pre-test Score	0.904	0.014	Not Normal
Post-test score	0.909	0.019	Non-normal

The significance values for the pretest ($p = 0.014$) and posttest ($p = 0.019$) are both smaller than $\alpha = 0.05$, so it is concluded that both data distributions are non-normal. Consequently, the hypothesis test uses a non-parametric statistic, namely the Wilcoxon Signed-Rank Test.

The Wilcoxon Signed-Rank Test was conducted to determine whether there was a significant difference between the pretest and posttest scores. The test results are presented in **Table 7**.

Table 7. Results of the Wilcoxon Signed-Rank Test

	N	Z	Asymp. Sig. (2-tailed)
Positive Ranks	28 (100%)	-4.631	< 0.001
Negative Ranks	0	-	-
Ties	0	-	-

The results show that all 28 students (100%) were in the positive ranks—meaning that not a single student experienced a decline in their score. The Z-value was -4.631 with an Asymp. Sig. (2-tailed) < 0.001 , well below $\alpha = 0.05$. Thus, the research hypothesis was accepted: there was a statistically significant improvement in locomotor skills following the LVE-based Bentengan game intervention ($p < 0.001$).

To measure the magnitude of the intervention's effectiveness proportionally, an N-Gain calculation was performed using Hake's (1999) formula. The results are presented in **Table 8**.

Table 8. Results of the N-Gain Analysis of Locomotor Skills

Statistics	Value	Category	Description
Average N-Gain	0.60	Moderate	Approaching the upper limit
Minimum N-Gain	0.42	Medium	No low category
Maximum N-Gain	0.72	High	-

The average N-Gain of 0.60 (60.20%) falls within the moderate category ($0.30 \leq g < 0.70$), approaching the threshold for the high category ($g \geq 0.70$). No students were in the low category. These findings indicate that the intervention provided has substantial effectiveness in improving students' locomotor skills.

The qualitative component of this mixed-methods study aims to explain and deepen the quantitative findings by documenting the process of internalising LVE values over four sessions. Before presenting the observation results in further detail, it is necessary to explain the modifications to the rules of the Bentengan game designed to instil LVE values. These modifications were key to transforming the game into a 'living values laboratory'. The modified rules are presented in **Table 9**.

Table 9. Modifications to the Rules of the Bentengan Game Based on LVE

Rule Modifications	Target Values & Indicators
The team determines roles (attacker, defender, rescuer)	Cooperation: carrying out roles as agreed, communicating strategy
Rescue: coordination between at least 2 people, calling out names	Teamwork: rescuing teammates, team communication
Penalty for breach: rescue a teammate first	Responsibility: admit mistakes, ensure safety
Playing according to one's respective role	Responsibility: carrying out defensive roles during tasks, communication
Must shake hands before/after	Respect: respect opponents
No taunting; the referee will issue a warning	Respect: no taunting; follow the rules; listen to the teacher
Balanced teams & giving opportunities	Respect: value differences in ability

The structure of each session is applied consistently across all four treatment sessions. Each session lasts 70 minutes (2 × 35 minutes) with the following time allocation:

Opening and warm-up (15 minutes)

The activity begins with a greeting, a prayer, and an introduction outlining the learning objectives and the LVE values to be instilled (cooperation, responsibility, or respect). This is followed by a dynamic warm-up that deliberately incorporates the six locomotor skills measured in the TGMD-2: running, galloping, hopping, leaping, horizontal jumping, and sliding.

Main activity: Bentengan game (40 minutes)

The main activity consists of two sessions of the Bentengan game, each lasting 20 minutes. All pupils are divided into four teams, each comprising 7 members (as there are 28 pupils in total). After 20 minutes, the teams are rotated so that each group has an equal opportunity to play. The rules of the Bentengan game were modified with an emphasis on safety and the application of LVE values: any foul (e.g. pushing an opponent) resulted in a penalty of having to rescue a teammate first, and the referee (teacher) actively provided positive reinforcement for cooperative behaviour, responsibility and respect.

Cool-down and values reflection (15 minutes)

After the main activity, pupils perform a cool-down (static stretching and relaxation) for 5 minutes. Next, the teacher leads a 10-minute values reflection discussion by asking open-ended questions such as: "What have you done to help the team today?", "How did you feel about your responsibility in defending the fort?", and "Did you respect your opponents?" Students are encouraged to share their feelings and experiences, after which the teacher provides reinforcement and summarises the values that have been practised.

Next, a structured observation was conducted using a validated observation sheet (average validity 91%; 'Highly Valid' category). The development of LVE scores across sessions is presented in **Table 10**.

Table 10. Development of LVE Value Observation Scores per Session

Session	LVE Score	Percentage	Category	Brief Description
First	22/60	36.67%	Poor	Students are still focused on winning; LVE scores are not yet clearly evident
Second	37/60	61.67%	Fair	Cooperation and responsibility are beginning to emerge spontaneously
Third	51/60	85.00%	Very Good	All LVE criteria are evident; locomotor movements are varied and more technical
Fourth	59/60	98.33%	Very Good	LVE criteria are fully internalised; 28 out of 28 pupils have mastered 6 movements with correct technique

The first session (score 22/60; 36.67%) indicated an orientation phase in which students were still adapting to the LVE-based modified Bentengan rules. The locomotor movements observed were limited to running activities with techniques that did not yet meet TGMD-2 standards. In the second session (37/60; 61.67%), the transition phase was marked by the emergence of spontaneous cooperation and a variety of locomotor movements (gallop, hop, leap, slide), albeit with low frequency. The third session (51/60; 85.00%) marked the consolidation phase: all six locomotor movements appeared consistently, and the LVE values (cooperation, responsibility, respect) were clearly evident in the students' behaviour. At its peak, in the fourth session (59/60; 98.33%), the LVE values had been fully and spontaneously internalised without prompting from the teacher, accompanied by all 28 students mastering the six locomotor movements with correct technique in accordance with the TGMD-2 criteria.

This qualitative data reinforces and explains the quantitative data: the rate of internalisation of LVE values increased progressively in parallel with the improvement in the quality of locomotor movements, confirming that the two dimensions mutually reinforce each other within the designed learning ecosystem.

The Effectiveness of LVE-Based Fort Games on Locomotor Skills

The results of this study clearly demonstrate that the implementation of the Bentengan traditional game, integrated with the Living Values Education (LVE) pedagogical framework, has proven to be effective and significant in improving the locomotor skills of Year 4 pupils at SDN Kanggraksan. In other words, the research hypothesis stating that this intervention has a positive effect on locomotor skills is accepted. These findings are confirmed by three key statistical parameters: (1) an average score increase of 15.50 points from the pre-test (22.29) to the post-test (37.79); (2) statistical significance in the Wilcoxon Signed-Rank Test with $Z = -4.631$ and $p < 0.001$; and (3) an average N-Gain value of 0.60, which falls into the moderate-to-high category. These three pieces of evidence reinforce one another and leave no doubt that the intervention was successful.

This effectiveness can be explained through the learning mechanisms inherent in the dynamics of the Bentengan game. Naturally and contextually, this game trains the full spectrum of locomotor skills measured by the TGMD-2. Running at full acceleration is a dominant element in pursuit and rescue activities, whilst leap and hop movements occur when players avoid contact or seize strategic positions. Galloping and sliding manoeuvres are used when players need to change direction quickly, whilst horizontal jumps occur when players leap over obstacles or mark territorial boundaries. Thus, every locomotor movement measured in the TGMD-2 instrument is automatically practised in a single game of Bentengan, as in Bentengan locomotor movements can occur flexibly according to the players' situational needs. Furthermore, all six locomotor movements are explicitly practised during the dynamic warm-up in every session. Consequently,

students become indirectly accustomed to performing these movements, as they are repeatedly practised in every session both within the context of enjoyable games and during structured drills. This creates what is known as 'disguised multi-skill training', where pupils practise all locomotor components simultaneously without perceiving it as formal, tiring training. This is the main reason why improvements occurred so rapidly in just four sessions.

These findings align with various previous studies confirming the effectiveness of traditional games in motor development. Research on skipping games reported significant improvements in the horizontal jump (38%) and hop (35%) following traditional game interventions. Similarly, a systematically developed traditional game-based learning model has been shown to significantly enhance basic running skills. Indeed, a game-based learning approach through classroom action research was reported to improve gross motor skills by up to 92% from baseline levels. The results of this study not only align with but also complement and reinforce this empirical evidence, particularly regarding the game of Bentengan as an intervention modality that has rarely been studied quantitatively to date.

The contribution of the LVE framework in promoting the improvement of locomotor skills cannot be overlooked. Observational results indicate that as the internalisation of LVE values increases, the quality and frequency of locomotor movements also improve in parallel. In other words, the better the students' character traits of cooperation, responsibility, and respect, the more optimal the improvement in their motor skills. This can be explained through the mechanism of intrinsic motivation: when students feel a sense of responsibility towards the team, they are more motivated to run faster, jump further, and move more nimbly for the common good. Respect for opponents encourages students to play more seriously and with greater focus, which in turn leads to better quality of movement. Thus, LVE not only shapes character but also functionally optimises physical activity within the game. In other words, LVE creates a motivational context that optimises physical activity within the game.

The Process of Internalising LVE Values in the Context of Bentengan

The results of the observations revealed a pattern of LVE value internalisation that took place progressively and gradually over four sessions. This progressive pattern is consistent with Kolb's experiential learning theory, which states that the internalisation of meaningful values requires a cycle of concrete experience, reflection, conceptualisation, and active experimentation. The structure of each session consistently designed with a values-based warm-up (15 minutes), the core game (40 minutes), and a reflection-cool-down (15 minutes) operationally implements this Kolb cycle. The first session constitutes the concrete experience phase, which has not yet been integrated with the value dimension. A crucial transition occurs in the second session when students begin to realise that the team's success depends on the ' ' of cooperation, rather than individual ability alone this is where post-game reflection plays a vital role. In the third and fourth sessions, these values enter the conceptualisation and active experimentation phases, eventually becoming spontaneous behaviour.

The Bentengan game proved to be an ideal medium for instilling LVE values due to its inherently cooperative structure. Responsibility arises contextually in defending the fortress and rescuing teammates; cooperation becomes a strategic necessity; and respect manifests itself in adherence to the rules and appreciation for opponents. These findings align with a study (Sholehatusun, 2023) which identified Bentengan as a micro-simulation of community life rich in PPK values. Unlike previous studies that treated character values as an implicit by-product, this research demonstrates that character education deliberately designed through the LVE framework yields far more measurable internalization reaching 98.33%, exceeding the minimum target of 75%.

This achievement also confirms LVE findings in other contexts: (Sunarno, 2023) reported the effectiveness of LVE in enhancing nationalism in Civic Education (PPKn) learning, (Seftiani, 2024) in preventing bullying behaviour, and (Rozak, 2023) in developing multidimensional intelligence. This study extends the evidence of LVE's effectiveness to the domain of physical education an area previously unexplored within this framework.

Theoretical Relevance and Practical Implications

Theoretically, the integration of the Bentengan game with LVE creates what might be termed a 'living values laboratory' a learning ecosystem in which psychomotor development and the internalisation of affective values occur simultaneously and reinforce one another. This approach addresses a theoretical gap identified in the literature: the absence of studies that systematically examine the dual impact (psychomotor and affective) of integrating traditional games with an explicit values-based pedagogical framework. Thus, this research offers a new pedagogical model: "game-based value-integrated physical education", which can contribute to the development of a holistic theory of physical education for the 21st century.

In practical terms, this study produces a learning protocol that physical education teachers can adopt directly. The three-part structure (15-minute value-based warm-up – 40-minute core game – 15-minute value reflection) has proven effective, easy to replicate, and does not require expensive specialised facilities or equipment. This is highly relevant for primary schools with limited resources, whilst also demonstrating that traditional games framed within an appropriate values framework are not outdated activities, but rather highly relevant pedagogical solutions for the current context of Indonesian education.

The findings of this research also provide empirical support for the nationally launched Character Education Strengthening Programme (PPK), in line with Ki Hajar Dewantara's educational vision of harmonising the cultivation of the heart, emotions, mind, and body. In the context of 21st-century physical education, which prioritises not only physical development but also the formation of strong character, collaborative skills, and resilience (Budiman, 2024), this approach addresses these needs in a practical manner.

Based on all the results and discussions presented, this study produced two complementary main findings:

Firstly, the implementation of the Bentengan traditional game based on LVE was statistically significant in improving the locomotor skills of Year 4 pupils at SDN Kanggraksan ($Z = -4.631$; $p < 0.001$), with an average score increase of 15.50 points and an N-Gain value of 0.60 (, moderate–approaching high category). All pupils (100%) showed improvement without exception, and all the established quantitative success indicators were successfully achieved.

Secondly, the process of internalising LVE values (cooperation, responsibility, and respect) proceeded progressively and consistently over the four sessions, with observation scores rising from 22 points (Low category) in the first session to 59 out of 60 points (Very Good category) in the fourth session, exceeding the set minimum target.

These two findings confirm the research hypothesis that the Bentengan traditional game, integrated with the LVE framework, is an effective, innovative, and holistic learning approach to optimising psychomotor development alongside character building in primary school pupils.

CONCLUSION

Based on the research results and discussion, it is concluded that the implementation of physical activities through the Bentengan traditional game, integrated with the Living Values Education (LVE) framework, has proven to be effective and significant in improving the locomotor skills of Year 4 pupils at SDN Kanggraksan. The average increase in locomotor skills scores from the pre-test (22.29) to the post-test (37.79) was 15.50 points or 69.57%, with all pupils (100%) showing an improvement without exception. The Wilcoxon Signed-Rank Test revealed a highly significant difference ($Z = -4.631$; $p < 0.001$), and the average N-Gain value of 0.60 falls within the moderate-to-high category, indicating substantial effectiveness of the intervention. Furthermore, the process of internalising LVE values (cooperation, responsibility, and respect) progressed progressively over the four sessions, with observation scores rising from 22/60 (Poor category) in the first session to 59/60 (Very Good category) in the fourth session, exceeding the research targets set. Thus, the Bentengan traditional game based on LVE values represents a holistic, innovative, and contextual approach capable of developing psychomotor skills whilst simultaneously shaping the character of primary school pupils. Physical Education teachers are advised to adopt this learning model as a locally-rooted alternative to optimise motor development and the instilling of character values within a single, meaningful learning unit. Nevertheless, this study has a number of limitations that must be explicitly acknowledged.

Firstly, the One-Group Pre-test-Post-test design without a control group limits the ability to draw causal inferences: the observed improvements cannot be fully attributed solely to the intervention, given the possible contribution of external factors such as the practice effect, familiarity with the test instruments, or physical activity outside the learning sessions. Secondly, the duration of the intervention four sessions is too short to draw conclusions about long-term effects; the sustainability of improvements in locomotor skills and the internalisation of character values cannot be confirmed without a follow-up test. Thirdly, the sample being limited to a single class in one school restricts the generalisability of the findings. Based on these limitations, several recommendations for further research are proposed: (1) future research is advised to employ a design with a control group (e.g., a Quasi-Experimental Pretest-Posttest Control Group Design) to strengthen internal validity; (2) a follow-up test should be conducted four to eight weeks post-intervention to assess the retention of locomotor skills and the sustainability of the internalisation of LVE values; (3) the duration of the intervention should be extended to a minimum of eight to twelve sessions so that its effects can be assessed more comprehensively; and (4) replication of the ‘’ with a more diverse population is required to test the generalisability of the proposed learning model.

REFERENCES

- Ade Pia Nurfajariyah, Intan Rizki Febriani, Pesty Nur Anissa, & Burhan Hambali. (2024). Strengthening The Character Of Primary School Pupils Through Traditional Games In Physical Education. *SPIRIT Scientific Journal: Sport, Education, Science & Research*, 24(2), 48–55. <https://doi.org/https://doi.org/10.36728/ijs.v24i2.3586>
- Ahsanul Huda Susanto, Murfiah Dewi Wulandari, & Darsinah. (2024). Optimising Learning For Primary School Children Through An Understanding Of Jean Piaget's Theory Of Cognitive Development. *Pendas: Journal of Primary Education*, 9, 689–706. <https://doi.org/https://doi.org/10.23969/jp.v9i4.17102>
- Anindya Syifa Nuraini, Haifa Annisa, Ismi Rahmayanti, Lailatul Qurrota Ayuni, Naila Zahra Nur Makiyyah, Siti Nur Aprilianti, & Agus Mulyana. (2024). The Integration of Character Values in Physical Education, Sport and Health (PJOK) Teaching at Primary School Level. *Mutiara: Journal of Research and Scientific Works*, 2, 80–94. <https://doi.org/https://doi.org/10.59059/mutiara.v2i3.1239>
- Apriani, A.-N., & Mahilda, D. K. (2024). The Living Values Education Programme (LVEP): Strengthening the Pancasila Student Profile of Learners in the Merdeka Curriculum. *Literasi: Journal of Educational Science*, 15, 227–235. [https://doi.org/https://doi.org/10.21927/literasi.2024.15\(2\).227-235](https://doi.org/https://doi.org/10.21927/literasi.2024.15(2).227-235)
- Aziz Haqqul Mubin, & Endi Rustandi. (2021). Development Of An Adventure-Based Learning Model To Improve Basic Locomotor Movements. *Research Physical Education and Sports*, 3, 7–17. <https://doi.org/10.31949/ir.v3i1.2779>
- Budiman, B., Burhaein, E., & Rusmana, R. (2024). Developing Social Skills through Cooperative Learning Models in Physical Education. *Jurnal Pendidikan Tambusai*, 8(1), 8674–8680. <https://doi.org/https://doi.org/10.31004/iptam.v8i1.13702>
- Christopher Butarbutar, N., Mahmud Hasibuan, A., Dwi Utami, N., Annisa, S., & Siddik, F. (2024). The Effectiveness of Traditional Games in Physical Education Teaching in Primary Schools. *Cakrawala Education and Biology Journal*, 1(3), 1–8. <https://doi.org/10.61132/jucapenbi.v1i3.36>
- David L Gallauhe, John C Ozmun, & Jacqueline D Goodway. (2012). Understanding Motor Development in Infants, Children, Adolescents and Adults. In Michael Ryan (Ed.), *MC. Graw Hill* (Seventh ed., pp. 1–461). McGraw-Hill.
- David R. Lubans, Philip J. Morgan, Dylan P. Cliff, Lisa M. Barnett, & Anthony D. Okely. (2010). Fundamental Movement Skills in Children and Adolescents. *Sports Medicine*, 40(12), 1019–1035.
- Gosha Arga Gumilang, K., Putu Ayu Vitalistyawati, L., & Luh Made Reny Wahyu Sari, N. (2023). The Relationship Between Physical Activity And Cardio-Respiratory Fitness In 9–12-Year-Old Children With The ‘’ Condition At Sd Negeri 4 Sibang Gede. *Indonesian Journal of Physiotherapy and Health*, 03(02), 2807–8020. <https://doi.org/https://doi.org/10.59946/ifki.2023.222>
- Gustian Uray. (2021). Effectiveness of Traditional Games in Stimulating Primary School Students' Motor Skill Development. *Journal of Physical Education and Sport*, 6(1), 75–80. <https://doi.org/10.17509/jpio.v6i1.27026>
- Hayati, A. A., & Kurniawan, D. T. (2020). Dolanan bocah caruban nagari as an effort to foster anti-corruption values in primary school students. *Jurnal Civics: Media Kajian Kewarganegaraan*, 17(1), 81–93. <https://doi.org/10.21831/jc.v17i1.28034>
- Immanuel Naibaho, G., Xaverius Masco Ginting, F., Della Sri Trinita Sinaga, Harlin Rivaldo Berutu, & Muhammad Rafli Syahrohni. (2024). Evaluation of Physical Education Teachers' Strategies in Developing Students'

- Sportsmanship Values at Budi Agung Junior and Senior High Schools, Medan. *Journal of Physical Health and Recreation (JPHR)*, 5(77), 5. <https://doi.org/https://doi.org/10.55081/jphr.v5i3.4668>
- Inggaswana, A. S., Maelina, M., Ulhaq, N. D., Herawan, E., & Hayati, A. A. (2025). Promoting Anti-Bullying Behaviour in Primary Schools Through Storybooks Based on Living Values Education. *AL-ISHLAH: Journal of Education*, 17(4). <https://doi.org/10.35445/alishlah.v17i4.7863>
- Irawan, F. A., Permana, D. F. W., Yuwono, Y., Asnawi, S., Pamungkas, A. T., Yunior, A. B. S., & Baktiyaningsih, L. (2022). The game of 'hadang' as a medium for physical education in promoting physical activity through the 'Lestari Budayaku, Bugar Bangsaku' programme. *Journal of Sport Education (JOPE)*, 5(1), 1. <https://doi.org/10.31258/jope.5.1.1-10>
- Muhamad Purkonudin, Danu Hoedaya, & Lingling Usli Wargadinata. (2022). The Process of Online Physical Education, Sport and Health Learning in Private Vocational Schools. *Journal Of Masters In Physical Education & Sport*, 203–214. <https://doi.org/10.37742/impo.v3i1.54>
- Mustaqimah, N., Wijaya, A., Latjompoh, M., Ashzar Ibrahim, Y., Rahmawati, E., Djerubu, D., Bayu Nugroho, P., Sutri Utami, E., Kusuma Wardhani, D., Wisendy Sina, M., Armianti Soemardjo, H., Rikson Maruwahal Sijabat, R., & Hidayah, N. A. (2024). Educational Psychology in Learning and Teaching. In M. Pd. T. Sarwandi (Ed.), *Educational Psychology in Learning and Teaching* (First Edition, pp. 1–202). PT. Mifandi Mandiri Digital.
- Nur, L., Suryana, D., Stephani, M. R., Guntara, R. G., Nilan, F., Rahmanda, M., Nawawi, D. A., & Salam, R. (2022). Development of Pancasila Student Profiles on the Mutual Assistance Character: Can Traditional Games through Socratic Method-based Learning Help? *Journal of Physical Education and Sport*, 7(2), 168–174. <https://doi.org/10.17509/jpio.v7i2.49090>
- Nurhadi, Gatot Jariono, & Nur Subekti. (2025). Improving 60-Metre Sprint Performance Through The Traditional Game Of 'Bentengan' Among Year 5 Primary School Pupils. *Pendas: Journal of Primary Education*, 10, 333–345. <https://doi.org/https://doi.org/10.23969/ip.v10i01.22523>
- Nuryadi, Jajat Darajat KN, Agus Gumilar, Martini Tri, Hambali, B., Muhammad Ginanjar, E., Tiara Yuniar, S., & Irwandi, B. (2024). Analysis Of Primary School Pupils' Motor Skills Post-Covid-19 Pandemic. *Journal of Physical Education*, 13(1), 1–12. <http://journal.ikipgriptk.ac.id/index.php/olahragaHal.1-12>
- Patimah, L., & Herlambang, Y. T. (2021). Addressing the Moral Decline of Generation Z Caused by Social Media Through the Living Values Education (LVE) Approach. *PEMBELAJAR: Journal of Educational Science, Teaching, and Learning*, 5(2), 150. <https://doi.org/10.26858/pembelajar.v5i2.18359>
- Purwanto, D., Rejeki, H. S., & Mentara, H. (2024). A game-based physical learning model to enhance gross motor skills in young students. *Jurnal SPORTIF: Journal of Learning Research*, 10(3), 503–520. https://doi.org/10.29407/js_unpgri.v10i3.23982
- Qurrota Nisa, I., Hanim Zen, at, Tussifa, L., & Hidayah, A. (2025). A Literature Review on the Traditional Games of Bentengan and Gobak Sodor in the Context of Motor and Social Development in Primary School Pupils. *Journal of Educational Innovation*, 2(3), 344–354. <https://doi.org/10.62383/edukasi.v2i3.1841>
- Rahma Wati & Rezki. (2025). Analysis of Basic Locomotor Skills Among Year 5 Pupils at SD Negeri 011 Simalinyang, Kampar Regency. *INNOVATIVE: Journal of Social Science Research*, 5, 214–227. <https://doi.org/https://doi.org/10.31004/innovative.v5i3.18970>
- Ramadhan, A. F., Suherman, A., Jajat, Sul-toni, K., Damayanti, I., & Ruhayati, Y. (2024). Compliance with WHO Physical Activity Guidelines in Early Childhood: An Evaluation Using Machine Learning Methods. *Journal of Health and Recreational Education*, 10(1), 184–195. <https://doi.org/10.59672/jpkr.v10i1.3490>
- Riadi, F. S., & Lestari, T. (2021). The Effectiveness Of Traditional Games On The Social Development Of Primary School Pupils In The Digital Age. *(JKPD) Journal of Primary Education Studies*, 6, 122–129. <https://doi.org/https://doi.org/10.26618/JKPD.V6I2.5392>
- Richard Bailey, Kathleen Armour, David Kirk, Mike Jess, Ian Pickup, & Rachel Sandford. (2009). The educational benefits claimed for physical education and school sport: an academic review. *International Journal of Sport and Exercise Psychology*, 24, 1–27.
- Ropi, U. A., & Kardani, G. (2021). The Effect of the Fundamental Movement Skills Programme on the Development of Social Processes (Associative and Dissociative) in Primary School Pupils. *JOURNAL OF PHYSICAL EDUCATION*, 7(1), 28–39. <https://doi.org/https://doi.org/10.25157/ikor.v7i1.5313>
- Rozak, J. A., Acesta, A., & Oktaviani, N. M. (2023). The Effect of Using the Living Value Education (LVE) Learning Model on the Character Education Scores of Year 5 Pupils at State Primary School 4 Purwawinangun. *Jurnal Ilmiah Wahana Pendidikan*, (23), 403–414.
- Seftiani, A. S., Fatimah, A., & Fuad, N. (2024). The Internalisation of Islamic Educational Values in Preventing Bullying Behaviour Among Pupils at Al-Mu'min Islamic Primary School. *Attractive: Innovative Education Journal*, 6(1). <https://www.attractivejournal.com/index.php/ai/>
- Sonni Setiawan, Sugito, Wing Prasetya Kurniawan, & Rendhitya Prima Putra. (2024). The Effect of Traditional Games on Improving the Physical Fitness of Pupils at Sidorejo State Primary School, Tuban Regency, Academic Year 2023/2024. *National Seminar on Science, Health, and Learning 4*, 646–655.

- Stephen Harvey, & Kendal Jarrett. (2014). A review of the game-centred approaches to teaching and coaching literature since 2006. *Physical Education and Sport Pedagogy*, 19(3), 278–300.
- Sunarno, S., Rukmini, B. S., & Puspita, A. M. I. (2023). The Living Values Education Programme to Enhance Nationalist Character in Primary School Students' Civic Education Learning. *Jurnal Educatio FKIP UNMA*, 9(1), 72–78. <https://doi.org/10.31949/educatio.v9i1.4328>
- Syaputri Sholehatur, Moh. Irawan Zain, & Prayogi Dwina Angga. (2023). Character Education Values in the Traditional Games of Bentengan and Gobak Sodor. *Journal of Classroom Action Research*, 5, 180–186. <https://doi.org/https://doi.org/10.29303/icar.v5i3.5545>
- Tiara Yuniar, S., & Hambali, B. (2023). Analysis Of Locomotor Movements Of Primary School Pupils In Year 3 And 4 During The Covid-19 Pandemic. *Riyadhoh: Journal of Physical Education*, 6, 2656–2936. <https://ojs.uniska-bjm.ac.id/index.php/riyadhohijurnal>
- Triansyah, A., & Gustian, U. (2020). The use of traditional games to improve the fundamental motor skills of primary school pupils. *Indonesian Journal of Physical Education*, 16(1), 78–91. <https://doi.org/https://doi.org/10.21831/ijpii.v16i1.30785>
- Wibowo Sulaeman, T., Ekonowati, & Haqiyah, A. (2023). Training In Methods For Identifying Students' Motor Skills Using The Tgmd-2 Test In Jayalaksana Village. *An-Nizām Journal: Institute for Research and Community Service*, 2, 91–98. <https://doi.org/https://doi.org/10.33558/an-nizam.v2i1.6811>
- Wijaya, S., Oktaviani, A. M., & Setiawan, H. G. (2025). The Effect of the Traditional Game of Jump Rope on the Motor Skills of Year 3 Pupils at SDN Kesaud. *RIGGS: Journal of Artificial Intelligence and Digital Business*, 4(3), 6662–6665. <https://doi.org/10.31004/riggs.v4i3.2994>
- Zulfikar, Hasyim, Ikadarny, & Anwar. (2021). Mastery Of Basic Movement Skills Among Primary School Pupils. *Journal of Sport Science*, 27–34. <https://doi.org/https://doi.org/10.17977/um057v11i1p27-34>