Development of a traditional Langga martial arts-based Physical Education learning model to improve basic movement skills in upper-class elementary school students

Desarrollo de un modelo de aprendizaje de Educación Física basado en las artes marciales tradicionales Langga para mejorar las habilidades motrices básicas en alumnos de los últimos cursos de primaria

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Abstract

Introduction and Objective. Physical education fulfills an essential role in developing fundamental motor skills in primary school children. However, traditional, monotonous and poorly contextualized teaching models can limit the full development of the student's driving potential. In this sense, the integration of local cultural elements, such as traditional Langga martial arts, represents an innovative pedagogical strategy. The objective of this study was to develop and evaluate the effectiveness of a physical education learning model based on Langga to improve fundamental motor skills in students in the last few primary courses. Methodology. The investigation was carried out through a research and development (I+D) approach, applying the ADDIE model (Analysis, Design, Development, Implementation and Evaluation). The participants were fifth-grade students from two educational institutions: SDN 1 East Suwawa and SDN No. 88 Sipatana Goron-talo. Data collection techniques included observations, questions, standardized tests of fundamental motor skills (locomotor, non-locomotor and manipulative), as well as interviews with teachers. Model validation was carried out in two phases: a small-scale pilot test and a large-scale implementation.
Results. The experts indicated that the learning model developed is practical, feasible and effective. A significant improvement was observed in the fundamental motor skills of students, particularly in the locomotor, locomotor and manipulative domains. Asimismo, the professor positively valued the clarity of the contents, the applicability of the model and its alignment with the curricular objectives. The integration of Langga martial arts allows us to further promote the link between physical activity and local cultural identity.
Conclusions. The physical education model based on Langga demonstrated to be an effective pedagogical tool to strengthen motor development in primary school students, while promoting education in cultural values and character strengthening. Its implementation in other school contexts is recommended as an innovative, contextualized and culturally relevant teaching strategy.

Keywords

Physical Education, basic movement, learning model, martial arts, elementary school.

Resumen

Introducción y Objetivo. La educación física cumple un rol esencial en el desarrollo de las habilidades motrices fundamentales en niños de edad escolar primaria. No obstante, los modelos de enseñanza tradicionales, monótonos y poco contextualizados, pueden limitar el desarrollo pleno del potencial motriz del alumnado. En este sentido, la integración de elementos culturales locales, como las artes marciales tradicionales *Langga*, representa una estrategia pedagógica innovadora. El objetivo de este estudio fue desarrollar y evaluar la eficacia de un modelo de aprendizaje de educación física basado en *Langga* para mejorar las habilidades motrices fundamentales en estudiantes de los últimos cursos de primaria. Metodología. La investigación se llevó a cabo mediante un enfoque de investigación y desarrollo (I+D), aplicando el modelo ADDIE (Análisis, Diseño, Desarrollo, Implementación y Evaluación). Los participantes fueron estudiantes de quinto grado de dos instituciones educativas: SDN 1 East Suwawa y SDN n.º 88 Sipatana Gorontalo. Las técnicas de recolección de datos incluyeron observaciones, cuestionarios, pruebas estandarizadas de habilidades motrices fundamentales (locomotoras, no locomotoras y manipulativas), así como entrevistas a docentes. La validación del modelo se realizó en dos fases: una prueba piloto a pequeña escala y una implementación a gran escala. Resultados. Los hallazgos indicaron que el modelo de aprendizaje desarrollado es práctico, factible y eficaz. Se observó una mejora significativa en las habilidades motrices fundamentales de los estudiantes, en particular en los dominios locomotor, no locomotor y manipulativo. Asimismo, el profesorado valoró positivamente la claridad de los contenidos, la aplicabilidad del modelo y su alineación con los objetivos curriculares. La integración de las artes marciales *Langga* permitió además fomentar el vínculo entre la actividad física y la identidad cultural local.
Conclusiones. El modelo de educación física basado en *Langga* demostró ser una herramienta pedagógica efectiva para fortalecer el desarrollo motriz en estudiantes de primaria, al tiempo que promueve la educación en valores culturales y el fortalecimiento del carácter. Se recomienda su implementación en otros contextos escolares como una estrategia de enseñanza innovadora, contextualizada y culturalmente relevante.

Palabras clave

Educación Física, movimiento básico, modelo de aprendizaje, artes marciales, escuela primaria.

Introduction

Physical education has a vital role in students' physical, psychomotor, and social development. According to Gallahue & Ozmun (2012), fundamental movement skills are the primary foundation for developing more complex motor skills later in life. However, in elementary school learning, there are still many physical education learning models that are less effective in developing students' basic movement skills. Many schools still apply conventional methods that are less varied and less involve elements of local culture, potentially reducing students' interest in actively participating in learning.

One approach that can be applied in physical education learning is integrating elements of local culture, such as traditional martial arts. Martial arts function as a self-defense skill and a medium of physical and psychomotor development rich in cultural values and character (Harsono, 2015). In this case, Langga, one of Indonesia's traditional martial arts, offers excellent potential to improve students' basic movement skills. Langga has a variety of basic movements that can support the development of coordination, balance, strength, and agility, which are the main components of fundamental movement skills (Wijaya et al 2020).

Although various studies have been conducted on integrating culture in physical education, research on the effectiveness of traditional Langga martial arts in improving elementary school students' basic movement skills is still limited. Therefore, developing a Langga-based learning model that can provide innovative alternatives in physical education, especially in improving the fundamental movement skills of upper-class elementary school students, is necessary.

This study focuses on several key questions: How to develop a traditional Langga-based physical education learning model to improve the fundamental movement skills of upper-class elementary school students?, How effectively is the Langga-based learning model improving students' basic movement skills?

This research aims to: Develop a traditional Langga martial arts-based physical education learning model that can be implemented in elementary schools, and analyze the effectiveness of the learning model developed in improving the fundamental movement skills of upper-class elementary school students.

This research offers a novelty in developing traditional martial arts-based learning models that have not been widely studied in formal physical education. Several previous studies have examined the importance of physical education based on local culture (Mujriah et al., 2022) and the benefits of martial arts training in improving motor skills (Rahmat et al, 2021). However, no research has specifically developed a Langga-based learning model in the context of physical education for upper-class elementary school students. Therefore, this research fills the gap by offering an innovative and local culture-based model.

Some previous research relevant to this research includes (Mujriah et al., 2022), who researched the influence of physical education based on local culture on improving the movement skills of elementary school students. The study results show that integrating local culture in physical education can increase students' interest and participation in learning. Rahmat et al, (2021) conducted a study on the impact of martial arts training on the motor skills of school-age children. The results show that martial arts exercises can significantly improve students' balance, coordination, and agility. Wijaya et al (2021) examines the basic movements of traditional Langga martial arts and their potential in developing physical skills. This study found that movement in Langga has characteristics supporting basic movement skills development.

Referring to previous research, this study seeks to develop a Langga-based learning model that can be applied in physical education for upper-class elementary school students and test its effectiveness in improving their fundamental movement skills.

From various studies that have been conducted, it can be concluded that: Physical education based on local culture can increase student involvement in learning and enrich their learning experience. Martial arts training has significant benefits in developing students' fundamental motor skills. Traditional Langga martial arts have movement characteristics that can support the development of fundamental movement skills.

Based on this synthesis, this research will develop a Langga-based learning model systematically designed to optimize the fundamental movement skills of upper-class elementary school students. Thus, this investigation contributes to innovation in physical education and strengthens the preservation of local culture through more applicable and contextual learning.

This research has the following benefits: Contributing to developing a physical education learning model based on local culture that can be used as a reference in future research. Provide alternative learning models that physical education teachers can use to improve students' basic movement skills effectively and interestingly. By Policy: Be a consideration for policymakers in designing a physical education curriculum that is more contextual and based on local culture.

Thus, this investigation is expected to positively impact the development of physical education in Indonesia, especially in improving the fundamental movement skills of upper-class elementary school students through the traditional Langga-based martial arts approach.

Concepts of Physical Education and Basic Movement Skills

Physical Education is a discipline that focuses on developing physical skills, knowledge, and a positive attitude towards physical activity. The main goal of Physical Education is to improve physical fitness, develop motor skills, and instill values such as sportsmanship and cooperation. Effective Physical Education Programs are designed to provide a learning experience that allows learners to develop basic and complex movement skills essential in various physical activities and sports.

Research by (Lander et al., 2015) highlights the importance of Physical Education teacher training in fundamental movement skills. The study found that teachers who received specialized training in fundamental movement skills were more effective at teaching and assessing those skills in students. This shows that the teacher's competence greatly influences the quality of teaching in physical Education in terms of understanding and teaching fundamental movement skills.

Fundamental Movement Skills (FMS) include basic motor skills that are the foundation for more complex physical activities. FMS is usually categorized into three main groups:

1. Locomotor Skills: Involves moving the body from one place to another, such as walking, running, and jumping.
2. Non-Locomotor Skills: Involves movements performed without displacement, such as bending, stretching, and twisting.
3. Manipulative Skills: Involves the control of external objects, such as throwing, catching, and kicking the ball.

Mastering FMS early is important because it relates to physical activity levels later in life. A investigation by (Malambo et al., 2022) shows that children's physical activity levels significantly influence the development of FMS. More physically active children tend to have better basic movement skills, which supports their participation in various forms of physical activity and sports.

In addition, innovative learning approaches in Physical Education can improve FMS mastery. Traditional games in learning can effectively develop FMS in elementary school students. Traditional games improve motor skills and promote social and cultural interaction among learners.

The Importance of FMS Integration in the Physical Education Curriculum

Integrating FMS in the Physical Education curriculum has important implications for the child's overall development. Good FMS mastery in childhood was associated with higher levels of participation in physical activity in adulthood. In addition, a well-developed FMS contributes to increasing children's confidence and social competence. Therefore, educators must ensure that the Physical Education program emphasizes FMS teaching and assessment.

Physical Education plays a crucial role in developing basic motor skills that are essential for participation in physical activity throughout life. Mastery of Basic Movement Skills not only supports involvement in sports and physical activity but also contributes to individuals' physical and mental well-being. Consequently, educators and policymakers need to ensure that Physical Education programs are

designed in such a way as to support the effective development of FMS, through adequate teacher training, the use of innovative teaching methods, and the integration of FMS in the overall curriculum.

Physical Education Learning Model

The learning model in physical education plays a crucial role in achieving comprehensive educational goals, encompassing learners' physical development, motor skills, and social and emotional aspects. Choosing the right learning model can increase the effectiveness of the teaching and learning process and maximize students' potential in physical activities. Here are some standard learning models applied in physical education

1. Cooperative Learning Model

The cooperative learning model involves learners working in small groups to achieve a common goal. This approach emphasizes cooperation, individual responsibility, and positive interactions between group members. In physical education, this model can improve students' social and motor skills through activities that promote collaboration. Research shows that cooperative learning can improve physical education students' motivation and learning outcomes.

2. Tactical Play Learning Model

This model focuses on developing students' tactical understanding in game situations. The goal is to help students understand the concepts and strategies of the game so that they can make effective decisions during play. This approach improves technical skills and students' cognitive abilities in understanding the game's dynamics.

3. Competition-Based Learning Model

The competition-based learning model emphasizes the application of competition elements in the physical education learning process. Through well-designed competitions, students can be directly involved in various sports-related roles, similar to those in the general public. This approach can increase students' motivation, engagement, and social skill development.

4. Inquiry Learning Model

The inquiry learning model encourages learners to engage in discovery and problem-solving independently. In physical education, this approach can be used to develop students' critical and creative thinking skills and improve their understanding of certain concepts through exploration and experimentation.

5. Hands-on Learning Model

The hands-on learning model is a teacher-centered approach, where instructors provide explicit instruction and demonstrations of skills before students practice them. This approach effectively teaches basic motor skills and specific techniques in physical education. Although less interactive than other models, hands-on learning can ensure accuracy and consistency in teaching technical skills.

6. Project-Based Learning Model

In this model, students engage in projects integrating physical activity with other tasks, such as research or presentations. This approach allows learners to connect theoretical knowledge with practice, increasing their engagement and understanding of the importance of physical activity in daily life.

7. Problem-Based Learning Model

The problem-based learning model puts learners in situations where they have to solve real or simulated problems related to physical education. This approach develops critical thinking and problem-solving skills and encourages students to apply their knowledge in a practical context.

8. Technology-Based Learning Model

With the advancement of technology, the technology-based learning model has been adopted in physical education. Using apps, video tutorials, and other digital tools can enhance the student learning experience, provide instant feedback, and enable more personalized learning.

9. Differentiated Learning Model

The differentiated learning model tailors instruction and activities based on the students' individual needs, interests, and abilities. In physical education, this approach ensures that all learners, regardless of their ability level, can participate and develop according to their capacity.

10. Community-Based Learning Model

This model involves collaboration between schools and communities to provide learners with a relevant and contextual learning experience. Physical education can include working with local sports clubs, health organizations, or fitness facilities to enrich the curriculum and provide students with insight into physical activity opportunities in their communities.

The selection and implementation of appropriate learning models in physical education must consider the learning objectives, student characteristics, context, and resources available. Diverse and flexible approaches can increase learning effectiveness, motivate students, and support their holistic physical, cognitive, and social-emotional development.

Langga Traditional Martial Arts as a Learning Media

Langga traditional martial arts are a cultural heritage developed in Indonesia, especially in the Gorontalo region. Langga has historical value closely related to the local community's traditions and is inherited from generation to generation as a form of local wisdom. As a martial art, Langga aims to defend itself and be a means of character formation, discipline, and strengthening cultural identity for the younger generation (Kamarol Zaman, 2023).

In physical education, Langga can be used to improve students' fundamental motor skills. The movements in Langga involve a combination of physical aspects such as coordination, balance, and agility, which contribute to the development of fundamental movement skills of elementary school-age children (Wijaya et al., 2021). Thus, the integration of Langga in PJOK learning enriches teaching materials and supports the preservation of local culture.

Langga's martial arts movements consist of locomotor, non-locomotor, and manipulative archetypes. Locomotor movements in Langga involve basic steps back and forth, changing places, and jumps that help improve body control and physical endurance. Meanwhile, non-locomotor movements such as defensive posture and body position strengthen stability and dynamic balance (Mujriah et al., 2022).

The manipulative abilities in Langga, which involve punches and parries, also play a role in developing hand-eye coordination, muscle strength, and movement accuracy. According to research conducted by Setiawan et al. (2023), martial arts-based learning significantly improves the basic motor skills of elementary school-age children compared to conventional learning methods. Therefore, integrating Langga in physical education can be an innovative alternative in improving students' movement skills.

Compared to other martial arts such as Pencak Silat or Taekwondo, Langga has characteristics that emphasize agility and endurance without relying too much on special equipment. This makes it more adaptable for physical education learning in elementary school. In addition, Langga has elements of traditional games that can make learning more interesting and interactive for learners (Bessa et al., 2021).

As a learning medium, Langga teaches social and cultural aspects not always found in modern martial arts. The elements of cooperation and sportsmanship in Langga practice can help improve students' social skills, which is important for character formation in physical education based on cultural values (Yusuf & Ramdani, 2020).

Studies have shown that martial arts training can significantly improve a child's motor skills. A investigation by (Stamenković et al., 2022) found that children who participated in traditional martial arts programs improved balance, coordination, and flexibility compared to the group that only followed standard physical education.

In addition, another study by (Dwojaczny et al., 2021) states that martial arts programs implemented in physical education curricula can improve attention skills, self-control, and kinesthetic awareness in elementary school children. These findings support the idea that Langga, as a traditional martial art, has excellent potential to be used as an effective learning medium in developing fundamental movement skills of elementary school students.

The use of traditional Langga martial arts as a learning medium in physical education has many benefits, both in developing motor skills and in forming students' character. Langga provides a learning method that hones physical skills and strengthens cultural identity and social values. Therefore, developing a Langga-based learning model that can be integrated into the primary school physical education curriculum is important to increase learning effectiveness and preserve local cultural heritage.

Previous Research on Cultural Integration in Physical Education

The integration of cultural values in physical education has been an important concern in various contemporary studies, especially to make learning more contextual, meaningful, and rooted in the local identity of learners. Physical education is no longer only seen as a means to improve physical fitness, but also as a medium for strengthening character, cultural identity, and inheriting the nation's noble values. In this context, a local culture-based approach is a practical and relevant strategy, especially in elementary school learning.

Several studies show that integrating local culture in physical education can enrich students' learning experiences and foster a sense of pride in their culture. Physical education learning that accommodates local cultural values can increase student participation and create a learning environment that is more inclusive and relevant to their social context. (Larsson & Nyberg, 2016) mentioned that a culture-based approach to physical education can reduce the dominance of Western culture in the curriculum and make room for traditional practices with high educational value.

In Indonesia itself, the potential for the integration of local culture into physical education is enormous, considering the diversity of ethnicities, arts, and traditions that it has. One of the strategies that has been pursued is using traditional games and regional sports as part of the PJOK curriculum. Research by Andriani et al. (2020) shows that traditional games such as gobak sodor, egrang, and engrang batok can improve students' fundamental motor skills while instilling social values such as cooperation, sportsmanship, and responsibility. However, most of these integration efforts are still fragmentary and have not been raised in the form of a systematic and structured learning model.

Children can learn to socialize through games, and that "sport also plays an important role in the development of identity, national independence and nationalism", indicating the great potential of physical education as a means of integrating cultural values. However, no learning model explicitly integrates traditional Indonesian martial arts into PJOK learning in elementary schools.

Furthermore, investigation by (Farias et al., 2021) emphasizes the importance of a pedagogical approach that incorporates elements of local culture, including traditional martial arts, to preserve cultural heritage while improving children's movement literacy. This approach is believed to bridge physical activity and a strong sense of local identity. However, very little research still focuses on developing physical education learning models based on traditional Indonesian martial arts, such as Langga, a martial art typical of the Gorontalo region, full of philosophical values and beautiful movements.

Therefore, this research gap needs to be filled immediately by developing a Langga-based PJOK learning model that aims to improve students' basic movement skills and instill cultural values, discipline, and pride in the nation's cultural heritage. This is important, especially in the framework of character and cultural education development carried out by the Independent Curriculum, which emphasizes the importance of contextual, humanistic, and relevant learning to the environment of learners.

Conceptual Framework of the Langga-Based Learning Model

The Langga-based learning model, a distinctive form of movement and culture from Gorontalo, is designed to integrate elements of local culture into the learning process of physical education. The conceptualization of this model includes an in-depth understanding of students' cognitive, affective, and psychomotor aspects through a contextual and culturally meaningful approach. Integrating local culture in education is believed to increase the relevance of learning, student involvement, and the preservation of regional culture (Xiang, 2024).

The conceptual framework of this learning model is based on three main principles: (1) Integration of local culture in learning activities, (2) Thematic and contextual approaches, and (3) Improvement of motor competence and character of learners. In the context of Langga, typical movements such as kicks,

parries, and step patterns are the basis for developing fundamental movement skills. This aligns with a constructivist approach to physical education that emphasizes learning through meaningful experiences (Casey & MacPhail, 2018).

The integration of local cultures, such as Langga, in the learning process of physical education allows students to learn in a familiar and socially relevant context. According to (Evayanti et al., 2025), a culture-based approach to physical education can increase student motivation, form cultural identity, and facilitate learning values such as sportsmanship, cooperation, and social responsibility. In this case, Langga is a form of physical exercise and a medium for character building.

In this model framework, teachers play the role of facilitators who design learning activities by modifying the elements of Langga movements into games, simulations, or movement tasks according to the learning outcomes of physical education. The local context is used as a bridge between the subject matter and the students' daily lives. This approach is efficacious in improving student learning outcomes in physical education, as (Dyson et al., 2004) reported that culture-based contextual learning can deepen students' understanding and social skills.

The psychomotor component in this model is developed through hands-on practice of the Langga technique, which involves muscle strength, coordination, balance, and agility. Meanwhile, the affective aspect is emphasized through the cultural values contained in Langga, such as courage, politeness, and respect for opponents. In the cognitive context, learners are invited to understand the history, meaning, and philosophy of Langga's movements. This reinforces the holistic approach to physical education advocated by (Kirk, 2010), which is learning that is oriented to physical outcomes and the development of cultural identity and understanding.

This framework also refers to the principle of student-centered learning, where learners actively explore movements, reflect on values, and evaluate skills and attitudes during the learning process. Research by (Ennis, 2017) emphasizes the importance of learning design that places students as active subjects, so that there is emotional and social involvement in every physical activity carried out.

As an innovation in physical education, this conceptual framework supports the mastery of movement skills and broadens students' insight into local cultural values. Langga effectively conveys learning objectives in its entirety: physical, mental, social, and emotional. Therefore, Langga-based learning can be a representative model in building physical education that is contextual, inclusive, and culturally based.

Research Gap Synthesis and Gap

Physical, Sports, and Health Education (PJOK) is an integral part of basic education that aims to shape students' motor skills, physical fitness, and social and emotional values. One of the important foundations in PJOK is mastering fundamental movement skills, including locomotor, non-locomotor, and manipulative skills. These skills are the foundation for advanced physical activity and are an important indicator in the growth and development of elementary school-age children (Pangrazi & Beighle, 2016)

Previous studies have confirmed the importance of developing motor skills through contextual approaches, including play-based learning models and local cultures. A study by (Williams, 2017) shows that a pedagogical approach integrating local culture in PJOK can increase student participation and strengthen cultural identity. Similarly, (Irawan et al., 2021) found that traditional-based activities improved children's coordination and agility compared to conventional approaches. However, despite various innovative learning models, the application of traditional martial arts as a medium of learning PJOK is still minimal; moreover, Langga's martial arts from Gorontalo have not been widely studied scientifically.

Not many PJOK teachers at the elementary school level have mastered or integrated traditional Langga martial arts into the learning process. The movements in Langga, such as tidal posture, stance, and agility techniques, have basic movement characteristics that can be developed to improve students' motor skills (Hadjarati, 2018). This opens up great opportunities to develop a learning model that is not only physically effective, but also full of local cultural values and traditional wisdom.

Another gap identified is that almost all PJOK curricula in elementary schools refer to martial arts such as Pencak Silat or Taekwondo, which have been standardized in the national curriculum, but do not leave room for the exploration of other traditional martial arts that have similar potential. This causes opportunities for the use of Langga in learning to be neglected, even though Langga has complete psychomotor, affective, and cognitive dimensions, and contains elements of art and spirituality that can enrich students' learning experiences.

Thus, this research has a strong foundation to answer this gap by designing a PJOK learning model based on traditional Langga martial arts. This model will be directed to optimize the fundamental movement skills of upper-class elementary school students, while introducing and preserving local culture through a contextual pedagogical approach. This effort also addresses challenges in developing the Merdeka curriculum, emphasizing project-based learning, differentiation, and local wisdom.

From the literature review and the findings of the needs of PJOK teachers in the field, it can be concluded that there has been no development of a PJOK learning model that systematically uses Langga martial arts to improve the fundamental movement skills of elementary school students. This is the scientific gap that this research aims to fill. this investigation develops the model and tests its validity, practicality, and effectiveness, so that the results can be operationalized in daily learning practices.

Method

Types of research

This research and development aims to produce a traditional Langga martial arts-based physical education learning model that can improve the fundamental movement skills of upper-class elementary school students. This development research is designed to answer the problem of the limitations of learning models that are relevant to the characteristics of learners and the low basic movement skills of students, especially in locomotor, non-locomotor, and manipulative aspects.

The development model used in this investigation is the ADDIE model, which consists of five main stages: Analysis, Design, Development, Implementation, and Evaluation. This model was chosen because it provides a systematic and structured approach to developing educational products and allows for continuous evaluation and improvement at every stage of development.

At the analysis stage, the needs and characteristics of students are identified, and the applicable curriculum is assessed. The design stage is focused on planning the structure of the Langga-based learning model. Furthermore, the development stage includes preparing teaching tools and supporting media. Implementation was carried out through a limited trial in selected elementary schools to see the practicality and applicability of the model. Finally, the evaluation stage was carried out to assess the model's effectiveness in improving students' basic movement skills.

Using this approach, it is hoped that the developed learning model is theoretically feasible, practical, and effective to be applied in PJOK learning at the elementary school level, especially the upper class. The subjects in this study were upper-class elementary school students, namely students in grades IV, V, and VI between the ages of 9 and 12. The selection of subjects is carried out purposively by considering specific criteria. These elementary schools have Physical Education, Sports, and Health (PJOK) subjects according to the national curriculum, and are ready to implement the traditional Langga martial arts-based learning model.

In addition, PJOK teachers at the school were also involved as participants in evaluating the practicality and feasibility of the developed model. The number of trial subjects consisted of one class at the limited trial stage and two at the field trial stage. The class selection was carried out based on the equivalence of the characteristics of the initial basic movement ability and the readiness of the learning logistics. Thus, the subjects of this study reflect the main target population in applying innovative learning models based on local culture in the context of physical education.

Research Procedure

This investigation procedure uses the ADDIE development model, which consists of five main stages, namely: Analysis (needs analysis), Design, Development, Implementation, and Evaluation. Each stage is described in detail as follows:

1. Analysis

The initial stage in this study aims to identify the learning needs and the background of the importance of developing a traditional Langga martial arts-based learning model. Activities at this stage include:

a. Preliminary study in the field through observation of the implementation of PJOK learning in upper-class elementary schools.

b. Interview with PJOK teachers to discover the obstacles to learning fundamental movement skills.

c. Analysis of curriculum documents (ATP, CP, PJOK teaching modules) to see the relevance of the material to the elements of basic martial arts movements.

d. Identify the characteristics of upper-class learners (ages 9–12 years), including interests, learning needs, and early motor skills.

2. Design

After the needs are analyzed, the design stage of the Langga-based learning model is carried out. Activities at this stage include:

a. The preparation of the structure of the Langga-based learning syntax consists of three main stages: preliminary activities, core activities, and closing activities.

b. The selection of learning methods is based on the characteristics of elementary school students, such as demonstrations, imitation of movements, simulations, and games.

c. Preparation of learning tool designs: teaching modules, student activity sheets, learning videos, and implementation guidelines for PJOK teachers.

d. Determination of success indicators includes improvement of fundamental movement skills (locomotor, non-locomotor, manipulative) and positive response to the learning process.

3. Development

The model's design is realized as an initial product at this stage. These stages include:

a. Preparation of Langga-based PJOK learning modules, which are equipped with illustrations of movements, learning steps, and Evaluation.

b. The production of a learning video featuring a demonstration of Langga's basic martial arts technique.

c. Preparing guidelines for using learning models intended for PJOK teachers to facilitate implementation.

d. Expert validation conducted by local physical education and cultural experts to assess model construction, content feasibility, and compatibility with the characteristics of high-class elementary school students.

e. Initial product revision based on input from validators to obtain trial-worthy products.

4. Implementation

This stage is a limited trial of the learning model in the specified elementary school. Activities at this stage include:

a. Learning activities for students in Grades IV to VI were implemented over three to four sessions using the Langga-based model of Physical Education (PJOK)

b. PJOK teachers have been given a Langga-based teaching guide training to carry out the learning process.

c. Data collection on the model's practicality through observation of learning implementation and questionnaires of student and teacher responses.

d. Documentation of students' activities in applying basic movements during Langga learning activities.

5. Evaluation

The last stage is an evaluation to determine the model's effectiveness in improving students' basic movement skills. Evaluation is carried out by:

a. Pre-test and post-test of basic motion skills (locomotor, non-locomotor, and manipulative) using motion performance assessment sheets.

b. Analysis of the increase in students' average scores before and after treatment.

c. Processing quantitative data from tests and qualitative data from observations and interviews to evaluate learning success.

d. Conclusions regarding the model's effectiveness and suggestions for further Development.

Research Instruments

The research instruments were used to collect relevant data to support developing and evaluating the Langga traditional martial arts-based physical education learning model. The instruments used in this study were systematically compiled and developed based on indicators relevant to the research variables, namely the *basic movement ability of* upper-class elementary school students and aspects of practicality and feasibility of the learning model.

Observation Instruments

Observation instruments were used to observe the Langga-based PJOK learning process implementation during the model implementation stage. Observations were made on teacher and student activities, focusing on student involvement, using learning models, and the suitability of activities with learning design.

Aspects observed include:

1. Suitability of the learning stages with the model (introduction, core, conclusion)
2. Emergent basic motion activity (locomotor, non-locomotor, manipulative)
3. Student response to learning activities
4. The role of teachers in facilitating Langga-based learning

Observation scale: using a Likert scale of 1–5, from *very inappropriate* to *very appropriate*.

Basic Motion Ability Test Instruments

This test measures students' basic movement skills before and after applying the learning model. Based on the national curriculum and related literature, the test was developed based on the indicators of basic movement ability of upper-class elementary school students.

Types of abilities measured:

1. Locomotives: Zig-zag running, long jump, 20-meter run
2. Non-locomotor: Body bending and twisting movements, static balance
3. Manipulative: Throwing the ball to the target, catching the ball, and kicking the ball into the goal
4. Format:
5. The test is carried out individually in an open field.
6. Criteria assess each skill: correct/incorrect, distance/accuracy, speed/time, and number of repetitions of movements in a given time.
7. The assessment uses rubrics consisting of scores of 1–4 for each aspect of the skill.

Student and Teacher Response Questionnaire Instrument

The questionnaire was used to obtain data on the Perception of learners and teachers towards the developed learning model.

1. Student Response Questionnaire, exploring students' perceptions of:

Involvement and pleasure in learning, Ease of following Langga movements, Understanding of basic movements through martial arts, Perception of the learning atmosphere. The questionnaire format is closed on a Likert scale of 1–5 (Strongly Disagree – Strongly Agree), and one or two questions are open for suggestions.

2. Teacher Response Questionnaire, exploring PJOK teachers' perceptions of:

Feasibility of the content and structure of the learning model, Ease of use of the model in learning, Suitability of the model with the characteristics of upper-class elementary school students, and Potential of the model in improving students' basic movement skills. The questionnaire format is a combination of Likert scale and open-ended questions.

Structured Interview Instruments

Used to dig up in-depth information from teachers and principals about:

1. The need for a learning model based on local culture
2. Advantages and disadvantages of the Langga learning model
3. Recommendations for future model development

Format: interviews using pre-drafted question guidelines, recorded (with permission), and qualitatively analyzed.

Before use, all instruments are validated by experts (expert judgment) in PJOK and learning evaluation. The validity of the construct is tested through the interconnectedness between items and the basic movement ability indicator. Reliability was tested using an internal consistency test (Cronbach's Alpha) for questionnaires and *an inter-rater reliability* test for observation instruments and skill tests.

Results and Discussion

Description of the Developed Learning Model

The learning model of traditional martial arts based on Langga is developed through systematic stages based on the ADDIE model, including needs analysis, design, development, implementation, and evaluation. This model emphasizes the use of basic movements contained in Langga martial arts to shape the motor abilities of elementary school students, such as locomotor, non-locomotor, and manipulative skills.

In model development, movement activities are adjusted to the characteristics of elementary school upper-class students in the advanced motor development stage. The movements in Langga, such as forward-backward steps, evasion movements, punches, and parries, are combined into a fun, adaptive, and educational learning format. The model consists of three main phases: the motion recognition phase, the practice phase, and the application phase, which are in the form of simple games.

The preparation of the model tool includes a teacher's manual, student activity sheets, and a basic motion evaluation format. This model also features thematic learning principles and a scientific approach, making it relevant to today's primary school curriculum.

Implementation and Trial Results

The model was implemented at SDN 1 East Suwawa and SDN No.88 Sipatana Gorontalo through limited and expanded trials. The model was tested on 15 students in the limited trial, while the extended trial involved 30 students. The results of the implementation show that this learning model can increase students' enthusiasm and active participation in the PJOK learning process.

The improvement of basic movement ability was measured through observation sheets that included agility, coordination, balance, and strength of leg and arm muscles. Students experience improved scores in almost all aspects of motor skills, particularly in locomotor movements such as running and jumping, as well as non-locomotor movements such as bending and twisting the body.

In addition, interviews with teachers show that this model is considered very effective in bridging local cultural values with physical learning goals. Teachers feel this approach is more meaningful because it contains a cultural context familiar to learners

Small-Scale Trials

Small-scale trials were carried out to determine the initial feasibility of the developed learning model. This test involved 15 SDN 1 East Suwawa. The activity was focused on three meetings with the delivery of basic material on Langga's movements.

Table 1. Small-scale

Aspects Assessed	Average Score (max. 100)	Category
Student Interest	82	Good
Understanding Movement	78	Good
Material Suitability	80	Good
Student Physical Activity	76	Good

Description
70- 85= Good
86-100= Excellent

From small-scale trials, results were obtained that students were able to participate in learning with enthusiasm, the material was easy to understand, and the physical activity displayed was quite in accordance with the characteristics of upper-class elementary school students.

Large-Scale Trials

Large-scale trials were conducted on 30 students from two different elementary schools. The model was fully implemented in six meetings.

Table 2. Large-scale

Aspects Assessed	Average Score (max. 100)	Category
Smooth Implementation	85	Good
Understanding Instructions	80	Good
Teacher-Student Interaction	83	Good
Mastery of Movement	79	Good

Description
70- 85= Good
86-100= Excellent

The implementation of the model on a large scale shows very positive results. The interaction between teachers and students is effective, students are active, and are able to follow all Langga-based learning series.

Practicality Test

The practicality of the model is assessed through teacher questionnaires and observation of learning implementation.

Table 3. Practicality Test

Responden (Guru)	Practicality Aspects	Score (max. 100)	Category
Teacher 1	Material Implementation	84	Very Practical
Teacher 2	Ease of Use Guide	88	Very Practical

Description
70-79 Practical
80-100 Very Practical

The teacher stated that the model was very easy to implement, especially because the guidelines for use were very clear, and the activities were arranged systematically and contextually according to the students' abilities.

Effectiveness Test

The effectiveness of the model was tested through a comparison of pretest and posttest scores of basic motion skills.

Table 4. Effectiveness Test

Basic Motion Components	Pretest (Rata-rata)	Posttest (Rata-rata)	Difference	Category Changes
Lokomotor (lari/lompat)	65.2	79.8	+14.6	Increase
Non-Locomotor (bending/rotating)	64.5	78.3	+13.8	Increase
Manipulative (hit/deflect)	66.7	80.1	+13.4	Increase

The increase in posttest scores shows that the Langga-based learning model is effective in significantly improving students' basic movement skills. This indicates that the integration of traditional gestures in physical learning provides positive results both physically and motivationally.

Model Effectiveness Analysis

The learning model's effectiveness was measured by comparing basic movement skill scores between before and after implementation. The results of quantitative data analysis showed an increase in the average basic motion score from the "fair" to the "good" category. The average pretest score was 65.4, while the posttest score increased to 79.4. This shows that the model can positively impact the development of students' movements.

Qualitative analysis through observation and interviews also supported the findings. Students look more motivated, active, and interested in learning when the Langga-based learning model is applied. This aligns with constructivist learning theory that emphasizes contextual and experiential learning.

Overall, this model is effective in achieving motor competence, but is also culturally relevant and supports character education through local values such as discipline, courage, and cooperation.

Conclusions

This research succeeded in developing a learning model of Physical Education based on traditional Langga martial arts, which was systematically designed to improve the fundamental movement skills of upper-class elementary school students. This model not only focuses on improving the motor aspects of learners but also integrates local cultural values in the learning process, thus providing a meaningful contextual approach.

The learning model was developed through the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) approach, with reinforcement on the selection of basic Langga movement materials by the student's developmental stage. The typical movements in Langga, such as steps, evasions, parries, and punches, are packaged in a series of fun, safe, and educational activities. This results in an adaptive, relevant, and applicable learning design to be applied in the elementary school environment.

The results of small-scale trials show that this model can attract students' attention and is easy to follow. The model shows excellent implementation on a large scale, with positive responses from teachers and learners. Teacher-student interaction increases significantly, and the learning process becomes more lively, participatory, and communicative.

The practicality of the model is also rated very high. Teachers feel helped by teaching tools that are complete and easy to use. This reinforces that the model is theoretically feasible and practical to implement in real learning activities in schools.

The model's effectiveness is evidenced by a significant increase in students' basic movement skills in locomotor, non-locomotor, and manipulative aspects. Quantitative data showed increased scores from

the "adequate" to "good" category. Meanwhile, qualitative data from observations and interviews showed that students experienced increased motivation, confidence, and understanding of cultural values in the movement.

Thus, the Langga-based learning model has proven effective, practical, and relevant for use in PJOK learning in elementary schools. In addition to supporting the achievement of basic movement competencies, this model also contributes to the preservation of local culture and the strengthening of students' character through the values contained in traditional martial arts. Therefore, it is highly recommended that this model be applied and further developed in the physical education curriculum based on local wisdom.

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