2025, Retos, 62, 787-795

Developing a traditional game-based physical education learning model to improve students' physical fitness: content validity

Desarrollo de un modelo de aprendizaje de educación física tradicional basado en juegos para mejorar la condición física de los estudiantes: validez de contenido

*Osa Maliki, *Wawan Sundawan Suherman, *Yudik Prasetyo, **Galih Dwi Pradipta, ***Paryadi, ****La Ode Adhi Virama, ***** Dewangga Yudhistira, ******Franciska Dina Dameria

*Universitas Negeri Yogyakarta (Indonesia), **Universitas PGRI Semarang (Indonesia), ***Universitas Mulawarman (Indonesia), ****Institut Agama Islam Negeri Kendari (Indonesia), *****Universitas Negeri Surabaya (Indonesia), ******Sportindo Mitra Riset Yogyakarta (Indonesia)

Abstract. Background: This study aimed to develop a physical education learning model based on traditional games. The research method employed was Research and Development (R&D), with the ADDIE model development method. This study included five material experts who are certified physical education teachers. The research is divided into three stages: qualitatively analyzing documents in the form of a review of relevant literature, followed by field observations and interviews that rationalize the problem so that it may be utilized to develop a learning model. Materials and methods: Researchers established a physical education learning model based on traditional games for improving physical fitness and a questionnaire to be presented to experts as an instrument. Results: Researchers validated their findings with five experts using the Delphi technique. The study's findings demonstrate that the overall content validity of each statement item is greater than 0.79, indicating that all statement items fit the criteria. Overall, the average score was 0.96. Conclusion: According to Aiken's validity, the physical education learning model based on traditional games to increase students' physical fitness can be implemented at the elementary school level.
Keywords: learning models, physical education, traditional games, physical fitness, content validity

Resumen. Abstracto. El objetivo de este estudio era desarrollar un modelo de aprendizaje de la educación física basado en los juegos tradicionales. El método de investigación empleado fue el de Investigación y Desarrollo (I+D), con el método de desarrollo del modelo ADDIE. En este estudio participaron cinco expertos en materiales que son profesores titulados de educación física. La investigación se divide en tres etapas, que son: análisis cualitativo de los documentos en forma de revisión de la literatura relevante, seguido de observaciones de campo y entrevistas que racionalizan el problema de modo que pueda ser utilizado para desarrollar un modelo de aprendizaje. Materiales y métodos: Los investigadores establecieron un modelo de aprendizaje de la educación física basado en los juegos tradicionales para mejorar la condición física y un cuestionario que se presentaría a los expertos como instrumento. Resultados: Los investigadores validaron sus conclusiones con cinco expertos mediante la técnica Delphi. Las conclusiones del estudio demuestran que la validez de contenido global de cada ítem de afirmación es superior a 0,79, lo que indica que todos los ítems de afirmación se ajustan a los criterios. En conjunto, la puntuación media fue de 0,96. Conclusiones: De acuerdo con la validez de Aiken, el modelo de aprendizaje de la educación física basado en juegos tradicionales para aumentar la forma física de los alumnos puede aplicarse en la escuela primaria.
Palabras clave: modelos de aprendizaje, educación física, juegos tradicionales, condición física, validez de contenido

Fecha recepción: 03-10-24. Fecha de aceptación: 27-10-24
Osa Maliki
osamaliki.2021@student.uny.ac.id

Introduction

Traditional game-based physical education learning can increase physical fitness in students of elementary school. (Adi et al., 2022). Several studies have shown the benefits of playing traditional games to improve motor skills, increase cardiorespiratory fitness, and encourage active engagement in students (Culajara, 2022; Pramantik, 2021; Tanucan, 2023). Several studies claim that traditional games can drive students to play actively, indirectly boosting their level of physical activity (Tanucan, 2023; Tanucan et al., 2023). However, additional in-depth study is still required to directly quantify the impact of improving physical fitness (Irmansyah et al., 2020). Another question is whether traditional games are still useful in today's elementary school environment (Liu et al., 2021; Saura & Zimmermann, 2021). In an era when digital technology increasingly dominates children's lives, the role of traditional games in meeting the needs and interests of the younger generation is a contentious issue (Bhinder et al., 2021; Brown et al., 2018).

Although traditional games can be enjoyable learning experiences, issues may arise about their benefits in accomplishing certain physical fitness goals (Aulia et al., 2022; Cocca, Baca, et al., 2020; Cocca, Verdugo, et al., 2020). Only a few research used traditional games as school-based interventions (Adnan et al., 2020). Although there is a lot of research on physical fitness in elementary schools, there is not much on using conventional games as part of physical education programs. As a result, there is some controversy about whether traditional game-based physical learning is appropriate for all elementary school settings and students (Birri et al., 2020).

Research conducted by Akbari et al (2009)examined the impact of traditional Iranian games on the motor skills of boys

in primary school aged seven to nine years. The study found that a traditional gaming intervention over eight weeks was more effective than a control team conducting routine daily activities. Traditional game interventions have been shown to increase children's locomotor skills (related to body movements such as running, jumping, and turning) and object control (skills in controlling objects such as throwing or catching) in children. A study by (Charles et al., 2017) examined how traditional Malaysian games including *Ketinting, Galah Panjang, Tor Panggang,* and *Tok Harimau* affected children's motor fitness. The researchers included 40 children (20 males and 20 females) with an average age of 12 years. The intervention lasted eight weeks, with three sessions each week. The duration of each session varies, with the first four weeks being 15 minutes and the following four weeks lasting 10 minutes each. The findings revealed a considerable increase in motor fitness at the post-test compared to baseline values.

This controversy is becoming increasingly relevant considering that traditional games have been proven to have various benefits in child development. Previous research has shown that traditional games can develop motor skills (Widodo & Lumintuarso, 2017), improve social skills (Kurniati, 2016), and preserve local cultural values (Andriani, 2012). However, amid digitalization, critical questions arise about how traditional games can remain relevant and provide optimal benefits for children's development.

This gap leads to the need to examine in depth how traditional games can be effectively integrated into the context of modern education. Although several studies have discussed the benefits of traditional games, there is still limited understanding of practical strategies for implementing them in contemporary digital educational settings. Therefore, this research aims to develop a traditional game-based learning model that is adaptive to the digital era, while maintaining the educational and cultural values contained in it.

The urgency of this research is reinforced by the fact that the current generation is at a tipping point between traditional cultural heritage and the demands of the digital age. In the absence of systematic efforts to integrate traditional games into modern learning contexts, there is a risk of losing the valuable pedagogical potential of this cultural heritage. The development of a learning model that accommodates these two aspects is crucial to ensure that children can get optimal benefits from both forms of play.

Materials and methods

Participants and data collection

The type of this research is the research and development (R&D) category. This study employed an ADDIE-based development approach. The ADDIE model is a learning design that focuses on individual learning, has both immediate- and long-term phases, is systematic, and takes a systemic approach to human knowledge and learning. Model development is defined as a conceptual design process that seeks to improve the function of an existing model by incorporating learning components that are thought to increase the quality of goal achievement (24). ADDIE is an abbreviation for Analysis, Design, Development, Implementation, and Evaluation. Based on the product development processes, this research and development model is more reasonable and comprehensive than the 4D model (Define, Design, Develop, and Disseminate). This model can be applied to a variety of product development applications, including models, learning techniques, learning methods, media, and learning materials. Dick and Carry established the ADDIE approach for designing learning systems. This study included both qualitative and quantitative analysis, and it was conducted concurrently or sequentially to achieve deeper insights (Dewangga Yudhistira, 2020; Yudhistira & Tomoliyus, 2020; Yulianto & Yudhistira, 2021).

The stages of developing this research are as follows: (1) Conducting an objective analysis to determine how the traditional game learning model can increase students' physical fitness in the twenty-first century. This stage is accomplished by analyzing the subject's qualities. In this case, the learning model created is intended for use by elementary school students; (2) Method design was carried out using ebooks, textbooks, and journal articles to create interesting and enjoyable traditional game models; and (3) The physical education learning model consists of four traditional games. Concurrently with method development, researchers developed an instrument in the form of a 1 to 5 Likert scale questionnaire with material tailored to aspects and indicators in the learning model.

This research uses the Delphi technique. The consensus process was carried out through three iterative rounds over three weeks, starting with an initial round of exploration using an open-ended questionnaire to identify key criteria. The second round focuses on consensus drafting through quantitative assessment using the Likert scale and written feedback, while the third round is used for model validation and finalization. The feedback mechanism uses a structured evaluation form with an assessment scale of 1-5, complemented by qualitative comments and improvement recommendations. Consensus is established based on quantitative criteria (minimum score of 4 out of 5, approval >80% of the panel, standard deviation <1.0) and qualitative criteria (conformity with theory, practical applicability, clarity of implementation, and sustainability of the model). Data analysis was carried out through a combination of thematic analysis, descriptive statistics, and data triangulation to ensure the validity of the results.

2025, Retos, 62, 787-795

Research Subject and Instruments

In this study, five physical education experts were selected to participate in the content validation process of traditional game-based learning models. Subject selection is carried out using the purposive sampling technique based on the following criteria: (1) Have a minimum Master's degree (S2) in the field of Physical Education or a related field; (2) Minimum 10 years of experience as a physical education teacher at the elementary school level; (3) Have a nationally recognized physical education teacher professional certification; (4) Familiarity with traditional Indonesian games and their application in the context of education.

This research was carried out in five elementary schools located in Pedurungan District, Semarang City, Central Java, namely Muhammadiyah 08 Elementary School, Pedurungan Kidul 02 State Elementary School, Pedurungan Kidul 03 State Elementary School, Pedurungan Kidul 05 State Elementary School, and Palebon State Elementary School 01. The selection of these five schools is based on consideration of the representation of various characteristics of schools that include public and private schools, as well as geographical proximity to allow for consistency of socio-cultural context in the research. The people in this region have urban characteristics with a Javanese cultural background that is still thick, although awareness of the preservation of traditional games has begun to decline with the times.

SD Muhammadiyah 08 as an Islamic-based private school has a superior program of character education, while the four State Elementary Schools have relatively equal characteristics and facilities as public schools. The implementation of the learning model in this study considers the conditions of each school, including the availability of infrastructure, teacher capabilities, and student characteristics, so that it can produce an adaptive and applicable model for various school conditions in urban areas. Data collection was carried out in a standardized manner in all five schools by paying attention to the coordination of the academic schedule and calendar of each institution, which was then comprehensively analyzed to identify general and specific patterns in the implementation of the traditional game-based learning model.

This research was carried out in the odd semester of the 2023/2024 school year, precisely in three weeks from October 5 to 22, 2023. The selection of this period takes into account the school's academic calendar which is the effective period of learning after the Mid-Semester Assessment (PTS). The implementation of the research, which lasted for 18 days, was divided into several systematic stages, starting with initial observation and baseline data collection in the first week (October 5-8, 2023), followed by program implementation in the second week (October 9-15, 2023), and ending with evaluation and final data collection in the third week (October 16-22, 2023). This temporal context is important considering that the research was conducted during the transition period after the COVID-19 pandemic period, where there were new adaptations in the learning process and changes in student social interaction patterns. Although limited to a three-week period, the study still considers recent developments in physical education and the dynamics of traditional games in the context of modern learning, as well as paying attention to the sustainability aspects of the program for long-term implementation.

Data Analysis

The Aiken formula was used to analyze the data in this study. Aiken's analysis seeks to determine the content validity of the model generated. The Aiken formula analyzes the content of the body weight training method itself (Dewangga Yudhistira, 2020).

Table 1.
Aiken Formula

Formula Aiken Lawshe
$V = \Sigma s / [n(c-1)]$
$S = r - lo$
Lo = the lowest validity rating score (eg 1)
C = the highest validity rating score (eg 5)
R = the score given by the assessor

Results

Qualitative Analysis Result

The findings of qualitative analysis using the Delphi technique according to input and suggestions from 5 material experts are presented in Table 2.

Table 2.
Feedback and Suggestions from 5 Material Experts

Expert	Feedback and Suggestions	Implementasi	Detail Perubahan
Expert 1	The model in the picture must be local and captured directly, rather than from a photo or example of a foreign model.	Cartoon image creation	Visual documentation before and after revisions
Expert 2	The learning model is good, but it is evident that before playing traditional games, create a warm-up in the form of an interesting game.	Addition of special warm-up sections, Development of 3-4 warm-up game variations, Preparation of 10-15 minutes warm-up guide	Game test report
Expert 3	The duration of physical education learning must be progressive based on the specified time duration.	Preparation of learning duration stages	Evaluation notes
Expert 4	Traditional game models, such as *Bentengan* (Game of Fort) and *Gobak sodor* (Stop and Run) game, have defined rules.	Creation of game rules manual	Assessment rubric
Expert 5	Learning models, such as teaching modules, must comply with the Independent Learning Curriculum.	Adjustment of the format to the standards of the Independent Curriculum	Curriculum review results

The table above highlights the feedback and suggestions of seven experts. Researchers make adjustments based on feedback and ideas to construct a learning model. The new model for conventional games will be offered following quantitative examination.

Quantitative Analysis Results

These quantitative results were obtained from Aiken's analysis which aims to see the validity of the content of the traditional game-based physical education learning model.

Table 3.
The Results of Aiken Analysis

No	Question	Assessment					S = r – lo					Σ	N*(c-1)	V = S/(n*(c-1))
		1	2	3	4	5	1	2	3	4	5			
1.	The traditional game-learning model is fascinating to apply.	5	5	5	5	5	4	4	4	4	4	20	20	1.000
2.	Traditional game model movements are simple for primary school students to implement.	5	5	5	5	5	4	4	4	4	4	20	20	1.000
3.	Elementary school students can easily implement the tool.	5	5	5	5	4	4	4	4	4	3	19	20	0.95
4.	Traditional game models can improve the ability to recognize basic locomotor, non-locomotor, and manipulative movement patterns.	5	5	5	5	4	4	4	4	4	3	19	20	0.95
5.	The traditional game learning model is aligned with the curriculum.	5	5	4	4	5	4	4	3	3	4	18	20	0.9
6.	The traditional game-learning model is aligned with basic competencies.	5	5	4	5	4	4	4	3	4	3	18	20	0.9
7.	Traditional game models are not harmful to students.	5	5	5	5	5	4	4	4	4	4	20	20	1.000
8.	The traditional game learning model that is used includes elements that represent novelty in traditional games.	5	5	5	5	4	4	4	4	4	3	19	20	0.95
9.	The traditional game-learning model encourages students to be active and move.	5	5	5	5	5	4	4	4	4	4	20	20	1.000
10.	Traditional game learning models are varied.	4	5	5	5	5	3	4	4	4	4	19	20	0.95
12.	The traditional game-learning model is innovative.	4	5	5	5	5	4	4	4	4	4	20	20	1.000
13.	The traditional game-learning model is effective in training locomotor, non-locomotor, and manipulative movements.	4	5	5	5	5	3	4	4	4	4	19	20	0.95

The results of the validity analysis using the Aiken formula on 13 items showed a very satisfactory level of validity, with the lowest value of 0.90 and the highest value of 1,000, far exceeding the threshold value of 0.79. These findings have significant practical implications: first, a high validity score indicates a strong consensus among the five expert assessors, demonstrating the clarity and accuracy of the items evaluated; second, the high consistency of values across items confirms that each component in the model has been well designed and relevant to the constructed being measured; Third, this strong validity provides a solid empirical foundation for the implementation of the model in a practical context, where the model can be used as a reliable evaluation instrument and can be used as a basis for decision-making; and fourth, these results also hint that the model has the potential to be replicated in a similar context with a high level of confidence. Thus, the validation results not only show the statistical power but also confirm the readiness of the model to be applied in real-world situations with a high level of reliability.

Based on the results of the validity analysis using the Aiken formula on 13 aspects of the evaluation of the traditional game-based physical education learning model, it was found that the model had a very good level of validity with an average value of V = 0.96. The five aspects of achieving a perfect validity value (V = 1,000) include the attractiveness of the learning model, the simplicity of movement, safety considerations, the promotion of student activities, and model innovation so that it does not require significant modifications.

The other five aspects showed strong performance (V = 0.950), namely the implementation of tools, the development of movement patterns, innovations in traditional games, game variations, and the effectiveness of movement exercises, which only required minor refinements such as the addition of alternatives for schools with limited resources and the improvement of movement complexity progress. Meanwhile, the two aspects that obtained the lowest validity score (V = 0.900) were curriculum suitability and basic competency suitability, which encouraged modifications in the form of revision of learning objectives to be more in line with the Independent curriculum, improvement of competency alignment documentation, and the addition of specific assessment criteria, although the validity value was still far above the minimum threshold of 0.79.

The results of these experts' evaluations not only validate the basic design strength of the model, but also provide clear guidance for the refinement of specific aspects, with a primary focus on strengthening the curricular alignment and documentation of competencies, without the need to make substantial structural changes to the core elements of the traditional game used.

Table 4.
Results of the Traditional Game-Based Physical Education Learning Model

Learning activity procedures
1. Teaching activities
a. Introduction (15 minutes)
1) The teacher prepares one of the students to prepare a line on the school field and say hello or good morning to the students;
2) The teacher asks a student to lead the prayer, and students pray based on their beliefs;
3) The teacher checks that all students are healthy, and asks sick students to rest in class;
4) The teacher encourages a positive learning environment by asking questions about the benefits of exercise for health and fitness;
5) The teacher assesses mastery of previously learned competencies through questions and answers.
6) The teacher explains the competencies that students must master after the learning process (as stated in the competency achievement indicators), followed by an explanation of the benefits of traditional game activities for Indonesian children, which is one of the activities that can improve physical fitness and sporting achievements in traditional games;
7) The teacher communicates the scope of the material to be studied, which is: traditional game activities for Indonesian children through Bentengan (game of fort), Gobak Sodor (stop and run), Kasti (rounders), and Kucing Jongkok (the squatting cat game);
8) Next, the teacher guides the warm-up so that students are coordinated with the material to be taught with a pleasant feeling. Warming up with games. The name of the game is chasing;
9) This learning can not only develop elements of movement skills and knowledge of movement, but it can also develop elements of cooperation and independence, as well as the values of the Pancasila Student Profile with indicators of regulating and internalizing movement values such as collaboration, caring, understanding oneself and the situation faced, and being able to regulate themselves and apply healthy lifestyle patterns in everyday life.
b. Core activities (75 minutes)
The steps for core learning activities are as follows:
1) Students look for and obtain partners based on what the teacher selects during the game.
2) Students and partners are given and studied a student worksheet that provides instructions and task indicators for typical Indonesian children's games such as Bentengan, Gobak Sodor, Kasti, and Kucing Jongkok.
3) Students divide the tasks of who will be the first "performer" and who will be the "observer". The perpetrators do traditional Indonesian children's game activities such as Bentengan, Gobak Sodor, Kasti, and Kucing Jongkok games one by one, while the observer monitors and provides feedback whenever a mistake happens.
4) Students shift positions after getting a signal from the teacher to participate in traditional Indonesian children's games such as Bentengan, Gobak Sodor, Kasti, and Kucing Jongkok games.
5) Students practice traditional Indonesian children's game activity activities such as Bentengan, Gobak Sodor, Kasti, and Kucing Jongkok games. In particular, the following is how Indonesian children can learn traditional game activities through the games of Bentengan, Gobak Sodor, Kasti, and Kucing Jongkok games:
ACTIVITY 1
Learning activities for variations in basic locomotor, non-locomotor, and manipulative movement patterns in traditional games are carried out through:
a) Facts, concepts, and procedures, as well as practices/exercises in the game of Bentengan
Knowledge about the concepts, facts, and procedures of the Bentengan game is learned through reading and discussing according to the assignment sheet provided by the teacher.
The procedures for practicing the Bentengan game are as follows:
(1) The game begins by dividing players into two teams of four to eight.
(2) Next, each team selects a pole or pillar to serve as its "fort/headquarters". Around the fort, there is a protected place for teams with poles or pillars. They do not need to be worried about being hit by an opponent if they are in a safe area.
(3) Members of the team will attempt to touch the opponent and render him "captive/caught".
(4) Players must frequently return and touch their castle since the "captor" and the "captive" are determined by the last time they touched the "fortress".
(5) The person who is closest in time to touch the fortress has the right to become the "captor". They can chase and touch opposing players to make them prisoners.
(6) The winner is the team that can touch the opponent's pole or pillar and shout the word "Benteng" (fort).

b) Facts, concepts, and procedures, as well as practices/exercises for the Gobak Sodor game
Knowledge about the concepts, facts, and procedures of the Gobak Sodor game is learned through reading and discussing according to the assignment sheet provided by the teacher.
The procedures to practice Gobak Sodor game movements are as follows:
(1) Create guard lines or borders for protection. Make lines similar to those used on a badminton court; the main difference is that there are no double lines in Gobak Sodor.
(2) Divide the players into two teams, each team consisting of 3-5 members (optional, adjust to the total number of members). One team will be the “fort guard” team and the other team will be the party trying to enter the fort.
(3) The "fort guard" unit must guard the field by horizontal and vertical line markings. The horizontal line "fort guard" must attempt to prevent the other team from entering the boundary line. Meanwhile, the "fort keeper" is responsible for guarding the entire vertical boundary line in the center of the field.

(4) The opposing team must pass through the lines and protections from beginning to end.

ACTIVITY 2

After completing activity 1, students learn traditional Indonesian children's game activities through the games of Bentengan and Gobak Sodor before moving on to activity 2, which teaches traditional Indonesian children's games through Kasti and Kucing Jongkok.

Activity 2 learning traditional games for Indonesian students through the game of Kasti and Kucing Jongkok includes the following:

a) Facts, concepts, and procedures, as well as practice/exercises in the game of Kasti

Knowledge about the concepts, facts, and procedures of the game of Kasti is learned through reading and discussing according to the assignment sheet provided by the teacher.

The procedures for practicing the movement of the game of Kasti are as follows:

(1) Divide the players into two teams.

(2) Each team chooses which order they will play in.

(3) Team A begins the game by throwing the ball to the opposing team (team B).

(4) Team B must attempt to catch the ball tossed by Team A. If the ball is caught by a member of team B, the player will attempt to strike a member of team A who is on the field with the ball.

(5) Regarding scoring points, if Team B players succeed in hitting Team A players with the ball, then Team B will get points. The player hit by the ball should leave the field.

(6) The ball is out of Court: If the ball is thrown and crosses the boundary line, then the team that threw the ball will lose their turn, and the ball is awarded to the opposing team.

(7) Alternating Play: After one team has finished throwing and the opposing team has succeeded in catching or hitting a player, it is their turn to play alternately. The playing teams continue to change until one of the teams scores a certain point or the allotted time runs out.

(8) The game continues with teams attempting to earn points by throwing the ball and striking rival players. The game ends when one of the teams scores a predetermined number of points or when the game time runs out.

b) Facts, concepts, and procedures, as well as practices/exercises in the Kucing Jongkok game

Knowledge regarding concepts, facts, and procedures for the Kucing Jongkok game is learned through reading and discussing according to the assignment sheet provided by the teacher.

The procedures for practicing the Kucing Jongkok game are as follows:

(1) Form a Circle: All participants stand in a circle with sufficient distance between each other. Participants can stand or squat in the circle.

(2) "Hunter" role: The "Hunter" (cat) sits in the center of the circle, while the other participants stand around them.

(3) Starting the Game: The game begins with the "hunter" attempting to catch the other participants by grabbing or touching them. Other players must avoid it by jumping or dodging quickly.

(4) Squat and Stand: a player who is standing may choose to crouch temporarily as a form of protection. However, they should not squat for too long.

(5) Player capture: If the “hunter (cat)” manages to touch or grab a standing participant, that participant becomes the next “hunter”. However, if the crouching participant manages to dodge or escape the "hunter's" grasp, they remain a player.

c. Closing activity (15 minutes)

1) One of the students, guided by the teacher, does a cool-down movement; the teacher inquires about the benefits.

2) Teachers and students reflect on what has and has not been achieved by the general objectives, as well as the errors that continue to occur when carrying out learning activities.

3) The teacher notifies students, teams, and students who excelled during learning activities.

4) The teacher assigns students with material related to the learning that has been carried out, where students are asked to read and make conclusions about traditional Indonesian children's game activities such as Bentengan, Gobak Sodor, Kasti, and Kucing Jongkok games. The results of what they do will become assignment tasks.

5) One of the students leads the prayer and greets everyone.

6) When returning to class, students follow protocol, and those who are on duty put away all equipment.

Discussion

The findings of a study assessing the content validity of the traditional game-based physical education learning model indicate that the model has excellent validity. This discussion will look at the research's implications and key findings, as well as share perspectives on the possibility of improving this learning model in the context of physical education.

One of the study's significant findings is that the traditional game-based physical education learning model applies to physical education concepts. This demonstrates that the use of traditional games as a mode of physical education learning can be consistent with the stated goals and values of physical education. In this concept, kids not only engage in physical activities but also learn about motor skills, collaboration, fair play, and local culture.

Aside from that, the research findings indicate that this learning model can be useful in increasing students' physical fitness. The traditional activities utilized in this program encourage students to walk around, improving their level of physical activity. In this environment, traditional games can be a compelling alternative to traditional learning methods. The success of this model in enhancing students' physical fitness can benefit their entire health and well-being.

Many students today are accustomed to video games or activities that require less physical movement (Chang et al., 2023). In this setting, traditional games can be an engaging way to introduce students to enjoyable and beneficial physical exercises (Roy, 2016). Traditional games frequently include body motions, motor skills, and social interactions, which can help students' physical and social development (Wahyu, 2022).

Previous research has demonstrated that traditional games can increase primary school students' physical fitness (Anwar et al., 2019; Cocca, Espino Verdugo, et al., 2020; Khoirudin et al., 2023). One study included a team of students who took part in a traditional gaming program for several months. The results revealed that the team experienced significant improvements in their physical fitness levels, such as muscle strength, cardiorespiratory endurance, and flexibility (Khoirudin et al., 2023). This demonstrates that traditional games can be an excellent way to increase physical fitness among elementary school kids.

The creation of traditional game-based learning models can also encourage active student participation (Khairudin et al., 2022). In certain traditional learning models, students may merely be spectators or listen to teacher explanations, with little opportunity to participate actively (Nurdiyan, 2018; Samodra, 2010; Touvan & Samodra, 2010). Traditional game-based techniques allow children to participate directly in physical activity. They become active participants, contributing to decision-making, teamwork, and motor skill development.

Traditional games in physical education could enhance students' learning experiences by exposing them to local culture and heritage (Ode et al., n.d.). Every region or country has its traditional games, which frequently represent the community's cultural values, traditions, and history (Hartanto et al., 2021). Traditional game-based physical education learning models can improve students' motivation and pleasure in physical activities. Students may become bored or unmotivated when performing repetitive physical exercise programs. However, using traditional games makes learning more enjoyable and exciting for students, allowing them to enjoy playing while also engaging in physical activities that are beneficial to their health.

This study develops a traditional game-based physical education learning model, but it needs to be acknowledged that

there are significant limitations in its methodology and scope. Although the results of content validation showed excellent values (V=0.96) and were in line with the findings of Akbari et al. (2009) and Charles et al. (2017) on the potential of traditional games in motor development, this study has not reached the stage of implementation and impact evaluation as carried out in these studies. These limitations create an important gap in our understanding of the effectiveness of models in real-world contexts, especially given the challenges identified by Liu et al. (2021) on the relevance of traditional games in the digital age and the questions raised by Bhinder et al. (2021) about their sustainability. To overcome these limitations, a systematic follow-up research agenda is needed including (1) a phased implementation study of at least 12 weeks in several schools with different characteristics, (2) a multi-dimensional evaluation including quantitative measurement of physical fitness and a qualitative analysis of user experience, (3) a contextual analysis of the factors influencing the success of the implementation, (4) the development of standardized evaluation instruments, and (5) a comparative study with a model conventional learning. This follow-up research is important to validate the theoretical assumptions of the model and understand its real impact on students' physical fitness, as highlighted by Irmansyah et al. (2020), as well as to identify the adaptations needed in the implementation in various school contexts. Thus, although this study provides a strong conceptual foundation, empirical validation through implementation and impact evaluation becomes the next crucial step to ensure the effectiveness and sustainability of the model in the context of modern physical education.

Conclusion

According to the research findings described in the discussion section, traditional games consistently improve students' physical health. The traditional game-based physical education learning model has been adjusted to the elementary school curriculum, student growth and development, and elementary school safety standards. These findings provide a solid foundation for the continued development and application of this learning model in the larger educational system. By taking the right approach and paying attention to the proposed recommendations, this model has the potential to become an effective approach to improving the physical fitness of students.

Acknowledgment

The authors would like to thank the participants in this research, as well as the Yogyakarta State University agencies, for their assistance and permission to complete this research successfully.

Conflicts of interest

All authors declare no conflict of interest.

References

Adi, B. S., Irianto, D. P., & Sukarmin, Y. (2022). Teachers' perspectives in motor learning with traditional game approach for early childhood. *Cakrawala Pendidikan*, *41*(1), 1–11. https://doi.org/10.21831/cp.v41i1.36843

Adnan, M., Shaharudin, S., Abd Rahim, B. H., & Ismail, S. M. (2020). Quantification of physical activity of Malaysian traditional games for school-based intervention among primary school children. *Journal of Taibah University Medical Sciences*, *15*(6). https://doi.org/10.1016/j.jtumed.2020.09.006

Akbari, H., Abdoli, B., Shafizadeh, M., Khalaji, H., Hajihosseini, S., & Ziaee, V. (2009). The effect of traditional games in fundamental motor skill development in 7-9 year-old boys. *Iranian Journal of Pediatrics*, *19*(2).

Anwar, M. C., Budiono, I., & Pamot, H. (2019). Traditional Softball Games Effective Modified for Improving Nutritional Status and Physical Fitness in Elementary School Children. *Jurnal Kesehatan Masyarakat*, *15*(2). https://doi.org/10.15294/kemas.v15i2.21524

Aulia, W., Suryansah, S., & Januarto, O. B. (2022). Pengaruh Permainan Tradisional Terhadap Tingkat Kebugaran Jasmani Siswa SMP: Literature Review. *Sport Science and Health*, *4*(1). https://doi.org/10.17977/um062v4i12022p94-102

Bhinder, N., Masliy, O., Ivanchenko, I., Petruk, V. A., & Bachynska, N. (2021). Evaluating the Effectiveness of Using Sport and Traditional Games at the Higher Military Educational Establishments in a Pandemic and Post-pandemic Period. *Annals of Applied Sport Science*, *9*(4). https://doi.org/10.52547/AASSJOURNAL.1061

Birri, Moh. S., Hariyanto, A., & Tuasikal, A. R. S. (2020). Development of Traditional Sport Game Model "Bentengan" for Student's Physical Fitness in Sports and Health Physical Education Learning (Case Study on Class IV MI Students of Maduran Lamongan District). *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, *3*(3). https://doi.org/10.33258/birle.v3i3.1251

Brown, K. A., Billings, A. C., Murphy, B., & Puesan, L. (2018). Intersections of Fandom in the Age of Interactive Media: eSports Fandom as a Predictor of Traditional Sport Fandom. *Communication and Sport*, *6*(4). https://doi.org/10.1177/2167479517727286

Chang, X., Zhen, T., & Wang, Y. (2023). Exploring the Innovative Pathways of Chinese Traditional Culture's Foreign Communication through "Domestic Games Going Abroad": A Case Study of Genshin Impact. *International Journal of Education and Humanities*, *8*(1). https://doi.org/10.54097/ijeh.v8i1.7253

Charles, M. A. G., Abdullah, M. R., Musa, R. M., Maliki, A., & … (2017). The effect of traditional games played with the rules intervention and regulations in-developing children's motor fitness abilities. *Man India*, *December*.

Cocca, A., Baca, J. E. C., Cruz, G. H., & Cocca, M. (2020). Does a multiple-sport intervention based on the TGFU pedagogical

model for physical education increase physical fitness in primary school children? *International Journal of Environmental Research and Public Health*, *17*(15). https://doi.org/10.3390/ijerph17155532

Cocca, A., Espino Verdugo, F., Ródenas Cuenca, L. T., & Cocca, M. (2020). Effect of a game-based physical education program on physical fitness and mental health in elementary school children. *International Journal of Environmental Research and Public Health*, *17*(13), 4883.

Cocca, A., Verdugo, F. E., Cuenca, L. T. R., & Cocca, M. (2020). Effect of a game-based physical education program on physical fitness and mental health in elementary school children. *International Journal of Environmental Research and Public Health*, *17*(13). https://doi.org/10.3390/ijerph17134883

Culajara, C. J. (2022). Integrating game-based approach in students learning experiences in physical education: A phenomenological study. *Edu Sportivo: Indonesian Journal of Physical Education*, *3*(3). https://doi.org/10.25299/es:ijope.2022.vol3(3).10520

Dewangga Yudhistira, T. (2020). Content validity of agility test in Karate kumite category. *Journal of Human Movement and Sports Sciences*, *8*(5), 211–216.

Hartanto, D., Kusmaedi, N., Ma'mun, A., & Abduljabar, B. (2021). Integrating social skills in traditional games with physical education interventions. *International Journal of Human Movement and Sports Sciences*, *9*(5). https://doi.org/10.13189/saj.2021.090513

Irmansyah, J., Lumintuarso, R., Sugiyanto, F. X., & Sukoco, P. (2020). Children's social skills through traditional sport games in primary schools. *Cakrawala Pendidikan*, *39*(1). https://doi.org/10.21831/cp.v39i1.28210

Khairudin, Maulana Iqbalwa, Musda Asmara, Lilis Sahara, Fera Zasrianita, Syukri Hamza, Hadi Winata, Yusi Tasika, Giyarsi, Sinarman Jaya, Ferri Susanto, Wahyu Ziaulhaq, Arif Samsurrijal, & Baihaqi. (2022). Permainan Tradisional Indonesia Sebagai Media Penanaman Nilai Moral Pada Siswa: Sebuah Studi Literatur. *Nusantara Education*, *1*(1 SE-Articles).

Khoirudin, M., Lanos, M. E. C., & Handayani, W. (2023). The Effect of Hadang and Bentengan Traditional Games on the Level of Physical Fitness of Students at SDN 02 Riang Bandung (Study of Literature). *Journal of Social Work and Science Education*, *4*(3), 703–711.

Liu, A., Xie, H., & Ahmed, K. (2021). Fault detection technology of national traditional sports equipment based on optical microscope imaging technology. *Alexandria Engineering Journal*, *60*(2). https://doi.org/10.1016/j.aej.2021.01.005

Nurdiyan, I. (2018). Model pembelajaran peer teaching dalam pembelajaran pendidikan jasmani. *Biormatika: Jurnal Ilmiah Fakultas Keguruan Dan Ilmu Pendidikan*, *4*(1).

Ode, L., Virama, A., Purnomo, E., Naviri, S., & Wali, C. (n.d.). *Axiology of Gobak Sodor As A Traditional Sport In Indonesia*. https://doi.org/10.14486/IntJSCS.2021.624

Pramantik, I. A. D. (2021). Optimization of Gobak Sodor Based Neuroscience Learning Game as Character Education in Intellectual Disabilities. *JUMORA: Jurnal Moderasi Olahraga*, *1*(02). https://doi.org/10.53863/mor.v1i02.231

Roy, B. (2016). High-Intensity Interval Training: Efficient, Effective, and a Fun Way to Exercise. *Health & Fitness Journal*, *17*(3).

Samodra, Y. T. J. (2010). Model Pembelajaran Direct Instruction dan Sport Education Model. *Jurnal ILARA*, *1*(2).

Saura, S. C., & Zimmermann, A. C. (2021). Traditional Sports and Games: Intercultural Dialog, Sustainability, and Empowerment. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.590301

Tanucan, J. C. M. (2023). The Difficulties of Teaching Traditional Filipino Games Online. *International Journal of Learning, Teaching and Educational Research*, *22*(3). https://doi.org/10.26803/ijlter.22.3.7

Tanucan, J. C. M., Bonato, G., Dinan-Thompson, M., & Salter, P. (2023). The Difficulties of Teaching Traditional Filipino Games Online. *Curriculum Studies in Health and Physical Education*, *22*(3). https://doi.org/10.26803/ijlter.22.3.7

Touvan, Y., & Samodra, J. (2010). Samodra, Model Pembelajran Direct Teaching Dan Sport Education Model MODEL PEMBELAJRAN DIRECT TEACHING DAN SPORT EDUCATION MODEL. *Jurnal ILARA*, *1*.

Wahyu, A. H. (2022). Studi literatur: Permainan tradisional sebagai media alternatif stimulasi perkembangan anak usia dini ARTICLE INFO ABSTRACT. *Jurnal Pendidikan Anak*, *11*(2).

Yudhistira, D., & Tomoliyus. (2020). Content validity of agility test in karate kumite category. *International Journal of Human Movement and Sports Sciences*, *8*(5), 211–216. https://doi.org/10.13189/saj.2020.080508

Yulianto, W. D., & Yudhistira, D. (2021). *Content Validity of Circuit Training Program and Its Effects on The Aerobic Endurance of Wheelchair Tennis Athletes*. *9*(c), 60–65.

Datos de los/as autores/as:

Osa Maliki	osamaliki.2021@student.uny.ac.id	Autor
Wawan Sundawan Suherman	wansuherman@uny.ac.id	Autor/a
Yudik Prasetyo	yudik@uny.ac.id	Autor/a
Galih Dwi Pradipta	galihdwipradifta@upgris.ac.id	Autor/a
Paryadi	paryadi@fkip.unmul.ac.id	Autor/a
La Ode Adhi Virama	laodeadhivirama@iainkendari.ac.id	Autor/a
Dewangga Yudhistira	dewanggayudhistira@unesa.ac.id	Autor/a
Franciska Dina Dameria	franciskamarpaung@gmail.com	Autor/a