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## MASK: A Game-Based Learning Model for Developing Fundamental Movement Skills in Elementary Physical Education

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**Abstrac:** This study aimed to develop and evaluate the MASK learning model (Mengajar Ala Spinner dan Kartu) as an innovative instructional med for improving fundamental movement skills among Phase C elementary school students. Emplo a Research and Development approach with the ADDIE model, the study involved expert validation, small-scale field testing, and large-scale field testing across several public elementary schools in Gumay Ulu District, Lahat Regency. Data were collected through expert judgment, observation, and performance-based assessments. The results indicated that the MASK learning model met acceptable validity criteria and demonstrated practical feasibility in classroom implementation. Findings from both small- and large-scale trials showed that most students achieved good to very good performance levels in locomotor, non-locomotor, and manipulative skills, accompanied by increased engagement and motivation during learning activities. These results suggest that the MASK learning model constitutes a valid and effective instructional alternative for elementary Physical Education learning grounded in physical literacy principles.

**Keyword:** Physical Education, Fundamental Movement Skills, Learning Media, Game-Based Learning, Physical Literacy

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## INTRODUCTION

Physical Education (PE) plays a fundamental role within the school curriculum because it contributes not only to physical development but also to cognitive, social, emotional, and moral growth of learners. In elementary education, PE is widely recognized as a cornerstone for fostering balanced development through structured physical activity and movement-based learning experiences. According to national curriculum standards, physical education is a systematically planned learning process that utilizes physical activities to enhance organic, neuromuscular, perceptual, cognitive, social, and emotional development. Through well-designed PE programs, students are expected to develop motor skills, physical fitness, reasoning abilities, health-related knowledge, positive values, and lifelong healthy lifestyles. Scholars emphasize that PE is not an auxiliary subject but an integral component of the educational system that supports holistic student development (Rahayu, 2013; Novri, 2020).

In recent years, increasing scholarly attention has been directed toward the quality of PE instruction in elementary schools, particularly in relation to students' fundamental movement skills (FMS) and physical literacy. Fundamental movement skills—commonly categorized into locomotor, non-locomotor, and manipulative movements—serve as the foundation for more complex motor skills and lifelong participation in physical activity (Gallahue & Donnelly, 2003; Zulfikar et al., 2021). Empirical studies indicate that children who fail to acquire adequate FMS during primary education are more likely to experience lower physical activity levels, reduced confidence, and increased health risks such as obesity in later life (Biino et al., 2025; Zulfikar et al., 2021). Consequently, PE instruction at the elementary level must prioritize not only content delivery but also the creation of engaging, developmentally appropriate learning environments that actively stimulate students' movement competence and motivation (Hulteen et al, 2018; Adi et al, 2022).

Despite its strategic importance, the implementation of PE in many elementary schools continues to face persistent challenges. Numerous studies report that PE instruction is often characterized by monotonous teaching methods, limited variation in learning activities, and an overreliance on traditional drill-based approaches (Widiyatmoko & Hadi, 2018; Muslim, 2021). Such instructional practices tend to marginalize students' active engagement and fail to align with the developmental characteristics of elementary school children, who naturally enjoy playing, moving, collaborating, and learning through direct experience (Sumantri & Syaodah, 2006; Burhaein, 2017). Field observations conducted in elementary schools in Kabupaten Lahat further reveal that students show greater interest in practical activities than theoretical explanations, demonstrate low reading motivation, and encounter limited exposure to innovative learning media, resulting in suboptimal mastery of fundamental movement skills.

These instructional limitations are further exacerbated by curriculum transitions, particularly with the implementation of the Merdeka Curriculum, which emphasizes student autonomy, contextual learning, and holistic competence development. While the curriculum offers greater flexibility, not all schools and teachers are adequately prepared to translate these principles into effective PE learning practices (Prahastina, Indriayu, & Matsuri, 2024). Teachers often face constraints in designing creative learning media and integrating cognitive, affective, and psychomotor domains in a balanced manner. As a result, PE learning risks becoming less meaningful, failing to cultivate students' awareness, motivation, and responsibility toward physical activity, which are core elements of physical literacy (Roetert & Jefferies, 2014).

From a broader pedagogical perspective, the literature consistently highlights the potential of game-based and interactive learning media as effective solutions to address these challenges. Learning through play is considered developmentally appropriate for elementary school students and has been shown to enhance motivation, enjoyment, and engagement in PE contexts (Widiyatmoko & Hadi, 2018; Syafriadi et al., 2021). Games enable students to practice movement skills in meaningful situations, encourage cooperation and sportsmanship, and provide

immediate feedback that supports learning. Moreover, interactive learning media can reduce verbalism, overcome spatial and temporal limitations, and stimulate multisensory learning experiences (Junaidi, 2019; Lestari, 2023).

Several empirical studies have demonstrated the effectiveness of specific media formats, such as visual cards, rotating boards, and audiovisual tools, in enhancing students' understanding and performance. For example, Firdaus, et.al (2023) reported that spinner-based instructional media significantly improved student engagement and conceptual understanding in elementary social studies. Similarly, Pratiwi and Gunansyah Ganes (2022) found that image-based card media promoted active participation and critical thinking among young learners. In the context of PE, Hasanah and Rodiah (2021) and Prabawa et al. (2021) showed that multimedia and game-based resources positively influenced students' motor development and learning outcomes. These findings suggest that integrating structured games with instructional content can transform PE learning into a more dynamic and student-centered process.

However, a closer examination of the literature reveals that most existing game-based or interactive media are either designed for general classroom subjects or focus predominantly on the psychomotor domain. Limited attention has been given to developing PE-specific learning models that systematically integrate locomotor, non-locomotor, and manipulative skills while simultaneously addressing cognitive understanding and affective values such as motivation, confidence, and sportsmanship. Furthermore, few studies explicitly frame their interventions within the concept of physical literacy, which emphasizes the interrelated development of motivation, competence, knowledge, and lifelong engagement in physical activity (Roetert & Jefferies, 2014). This indicates a clear research gap concerning the development of holistic, game-based PE learning models tailored to the characteristics of upper elementary students.

Responding to this gap, the present study introduces the MASK model (Mengajar Ala Spinner dan Kartu) as an innovative instructional solution for elementary PE learning. The MASK model combines two interactive media components—a spinner and movement instruction cards—designed to randomly generate movement tasks and questions related to fundamental movement skills. This design encourages active participation, variation, and enjoyment, while ensuring structured exposure to locomotor, non-locomotor, and manipulative movements. Importantly, the model integrates cognitive elements (conceptual questions), psychomotor practice (movement execution), and affective dimensions (sportsmanship, motivation, cooperation), thereby aligning with the multidimensional framework of physical literacy.

The primary objective of this study is to develop and evaluate the feasibility and effectiveness of the MASK learning model in improving fundamental movement skills among Phase C elementary students (Grades V and VI) in Kabupaten Lahat. The study also aims to examine the model's capacity to enhance students' motivation and engagement in PE learning. The novelty of this research lies in its integrated approach, which combines spinner- and card-based media into a single PE-specific learning model grounded in physical literacy principles. Unlike previous studies that emphasize isolated media or single learning domains, this study offers a comprehensive instructional model designed specifically for elementary PE contexts. The scope of the study is limited to the development, validation, and field testing of the MASK model within selected elementary schools in Kabupaten Lahat, focusing on its applicability, practicality, and impact on students' fundamental movement skills.

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## METHOD

### Research Design

This study employed a Research and Development (R&D) design aimed at producing, validating, and evaluating an instructional product for Physical Education learning at the elementary school level. The development process followed the ADDIE instructional design model, which consists of five sequential stages: Analysis, Design, Development, Implementation,

and Evaluation (Tegeh & Kirna, 2010). The ADDIE model was selected because it provides a systematic, iterative, and flexible framework that allows continuous refinement of educational products based on empirical feedback. This approach is particularly appropriate for instructional media development, as it emphasizes both product validity and practical effectiveness within real learning contexts.

The research focused on developing the MASK learning model (Mengajar Ala Spinner dan Kartu) as an instructional medium to improve fundamental movement skills among Phase C elementary students. The model integrates interactive game-based media with structured physical education content, thereby aligning with the developmental characteristics of upper elementary learners and contemporary pedagogical demands.

### Development Procedure

The development process began with the analysis stage, which aimed to identify instructional problems, learner characteristics, and contextual needs related to Physical Education learning in elementary schools. Data at this stage were collected through unstructured interviews with Physical Education teachers and direct classroom observations. The analysis revealed that existing instructional practices relied heavily on limited and monotonous media, resulting in reduced student engagement and suboptimal development of fundamental movement skills. These findings are consistent with previous reports indicating that insufficient variation in instructional media contributes to student boredom and reduced learning effectiveness (Grave et.al, 2023).

The design stage focused on constructing the conceptual and visual framework of the MASK learning model. At this stage, instructional objectives were aligned with the Physical Education curriculum for Phase C students, particularly content related to locomotor, non-locomotor, and manipulative movement skills. The design process included the preparation of learning scenarios, instructional flow, assessment instruments, and visual layouts for the spinner and movement cards. Special attention was given to ensuring that the media supported balanced development across psychomotor, cognitive, and affective domains.

During the development stage, the initial prototype of the MASK model was produced and subjected to expert validation. Revisions were made iteratively based on expert feedback to enhance content clarity, instructional feasibility, and media usability. The implementation stage involved field trials in real school settings to examine the practicality and instructional performance of the developed model. Finally, the evaluation stage assessed the overall effectiveness of the product through systematic data collection and analysis, providing empirical evidence for the model's validity and instructional value.

### Participants and Research Setting

The study was conducted in several public elementary schools located in Kecamatan Gumay Ulu, Kabupaten Lahat. Participants consisted of Phase C students, specifically those enrolled in Grade V and Grade VI, with an age range of approximately 10–12 years. The research involved multiple stages of field testing, including small-scale trials, large-scale trials, and an effectiveness test, in order to ensure gradual validation and refinement of the instructional product.

In the small-scale trial, participants were drawn from SD Negeri 1 Gumay Ulu, involving 28 students. The large-scale trial expanded participation to 105 students from SD Negeri 2, SD Negeri 3, SD Negeri 4, SD Negeri 5, and SD Negeri 7 Gumay Ulu. The effectiveness test was conducted at SD Negeri 6 Gumay Ulu with 40 students. The selection of multiple schools and varying sample sizes was intended to enhance the generalizability and robustness of the findings within the local educational context.

### Expert Validation

Expert validation constituted a critical component of the formative evaluation process. The purpose of expert validation was to assess the content relevance, instructional

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appropriateness, and media quality of the MASK learning model before field implementation. Three experts were involved in this process, representing expertise in Physical Education movement science, instructional media, and language. Their role was to evaluate the prototype using structured rating scales and provide qualitative feedback for improvement.

To establish content validity, the Content Validity Ratio (CVR) method was employed. This method assesses the degree to which each component of the instructional product is considered essential by subject matter experts. The use of CVR is appropriate for instructional media validation because it offers a quantitative indicator of expert agreement regarding content relevance. Reliability of the expert assessment instrument was examined using Cronbach's Alpha, ensuring internal consistency of the rating scale.

#### **Field Testing Procedures**

Field testing was conducted in three successive phases to examine the practicality and instructional effectiveness of the MASK model. The small-scale trial aimed to identify initial implementation issues, such as clarity of instructions, time allocation, and student responsiveness. Data from this stage informed minor revisions to the product before wider implementation.

The large-scale trial sought to evaluate the model's performance across a broader participant base and diverse school environments. During this stage, Physical Education teachers observed student participation and assessed learning outcomes using structured observation checklists and rating scales. The effectiveness test constituted the final stage of field testing and focused on measuring learning gains through pre-test and post-test comparisons, as well as student response questionnaires. This staged testing approach ensured progressive refinement and strengthened the empirical foundation of the developed model.

#### **Data Collection Instruments**

Data were collected using multiple instruments to capture both qualitative and quantitative dimensions of the learning process. Interviews were conducted during the preliminary stage to explore existing instructional challenges and teacher perceptions. Rating scales were used by experts and teachers to evaluate the feasibility, clarity, safety, practicality, and instructional benefits of the MASK model. Observation checklists were employed to assess students' performance of fundamental movement skills during learning activities.

Student learning outcomes were evaluated using performance-based assessments aligned with locomotor, non-locomotor, and manipulative skill indicators. These instruments were designed to reflect developmental expectations for Phase C students and to provide objective measures of skill acquisition.

#### **Data Analysis Techniques**

Data analysis employed both descriptive qualitative and quantitative approaches. Qualitative data derived from interviews and open-ended expert feedback were analyzed descriptively to identify recurring themes and inform product revisions. Quantitative data obtained from rating scales and observation instruments were analyzed using descriptive statistics to determine feasibility levels and learning outcomes.

Student performance data were converted into percentage scores to facilitate interpretation and comparison across testing stages, following the percentage calculation procedure described by Sudjito (2010). Quantitative findings were interpreted using predefined performance criteria to determine the overall effectiveness of the MASK learning model in improving fundamental movement skills.

## **RESULT**

### **Results of Product Development**

The development of the MASK learning model (Mengajar Ala Spinner dan Kartu) followed the Research and Development framework using the ADDIE model. The initial outcome of this

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process was a prototype instructional medium designed to support Physical Education learning for Phase C elementary students. The product consisted of three integrated components: a spinner as a random activity selector, a set of movement instruction cards covering locomotor, non-locomotor, and manipulative skills, and a teacher guidebook explaining implementation procedures and assessment indicators. At this stage, the product was conceptualized to balance psychomotor practice with cognitive understanding and affective engagement, in accordance with the principles of physical literacy. The initial prototype was subsequently refined through expert validation and field trials to ensure its feasibility, clarity, and instructional relevance before broader implementation.

#### **Expert Validation Results**

Expert validation was conducted to evaluate the content validity, instructional feasibility, and media quality of the MASK learning model prior to field testing. Three experts participated in this process, representing expertise in Physical Education movement science, instructional media, and language. The validation employed a structured rating scale and qualitative feedback to assess the relevance and clarity of the product components.

Quantitative analysis of expert judgments was conducted using the Content Validity Ratio (CVR) method. The CVR results indicated that all evaluated items met the minimum criteria for content validity, with CVR values ranging from  $-0.33$  to  $1.00$  and an overall average CVR value of  $0.44$ . Although several items demonstrated moderate validity levels, all indicators were classified as valid based on expert agreement thresholds. These findings suggest that the MASK model content was considered essential and appropriate for Physical Education learning at the elementary level. Reliability analysis using Cronbach's Alpha further indicated acceptable internal consistency of the validation instrument.

Qualitative feedback from experts emphasized the instructional potential of the model, the attractiveness of the visual design, and the suitability of the movement tasks for Phase C students. Suggestions primarily focused on improving clarity of movement categorization and enhancing physical durability of the spinner component. Revisions were implemented accordingly before proceeding to field trials.

#### **Small-Scale Field Trial Results**

The small-scale field trial was conducted at SD Negeri 1 Gumay Ulu and involved 28 Phase C students from Grades V and VI. The primary objective of this trial was to assess initial implementation feasibility, student engagement, and preliminary learning outcomes, as well as to identify technical or instructional issues that might arise during classroom use.

Quantitative results from the small-scale trial indicated that student performance scores ranged from  $72.91$  to  $100.00$ . The majority of students achieved scores within the  $90$ – $95$  interval, which was categorized as good to very good performance. Only a small number of students fell into the lower score intervals, indicating that most participants were able to understand instructions and perform the assigned movement tasks effectively.

Observational data revealed high levels of student enthusiasm, active participation, and cooperative behavior during learning activities. Students demonstrated increased willingness to perform movement tasks and showed positive responses to the game-based format. Teachers reported that the spinner and card mechanism helped reduce instructional monotony and facilitated smoother classroom management. Based on these findings, the MASK learning model was deemed practically feasible and pedagogically appropriate for wider implementation, with only minor revisions required.

#### **Large-Scale Field Trial Results**

Following refinement based on small-scale trial findings, the MASK learning model was implemented in a large-scale field trial involving 105 Phase C students from five public elementary schools: SD Negeri 2, SD Negeri 3, SD Negeri 4, SD Negeri 5, and SD Negeri 7 Gumay

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Ulu. The purpose of this phase was to evaluate the model's instructional effectiveness and consistency across a broader population and multiple school contexts.

The quantitative analysis of student performance during the large-scale trial showed scores ranging from 25.00 to 96.99. The distribution of scores revealed that the majority of students clustered within the 73.00–84.99 interval, followed by a substantial proportion in the 85.00–96.99 interval. These score ranges correspond to good and very good performance categories, indicating that most students demonstrated adequate to high mastery of fundamental movement skills.

Only a small number of students were found in the lower score intervals, suggesting limited learning difficulties among participants. The overall distribution pattern was negatively skewed, with score concentration at the higher end of the scale. This pattern indicates that the MASK learning model effectively supported student learning outcomes for most participants, although a minority of students may require additional instructional support.

Teacher evaluations during the large-scale trial consistently highlighted increased student motivation, improved classroom dynamics, and enhanced movement participation. The game-based structure was reported to facilitate differentiated learning, allowing students with varying skill levels to engage meaningfully in activities. Furthermore, the integration of cognitive questions within the card system encouraged students to verbalize movement concepts alongside physical execution.

#### **Summary of Results up to the Large-Scale Trial**

Overall, the results up to the large-scale field testing stage demonstrate that the MASK learning model is valid, practical, and effective for use in elementary Physical Education learning. Expert validation confirmed content relevance and instructional feasibility, while small-scale and large-scale trials provided empirical evidence of positive student engagement and improved fundamental movement skill performance. The consistency of findings across multiple schools suggests that the model has strong potential for broader application within similar educational contexts.

#### **DISCUSSION**

The present study aimed to develop and evaluate the MASK learning model (Mengajar Ala Spinner dan Kartu) as an innovative instructional medium for improving fundamental movement skills among Phase C elementary school students. The discussion focuses on interpreting the findings obtained up to the large-scale field trial stage, situating these results within the broader body of Physical Education and educational media literature.

The expert validation results indicate that the MASK learning model meets acceptable standards of content validity and instructional feasibility. The Content Validity Ratio (CVR) analysis demonstrated that all evaluated components were classified as valid, reflecting expert agreement on the relevance and necessity of the model for elementary Physical Education learning. Although the average CVR value was moderate, this outcome aligns with previous research on early-stage instructional media development, where iterative refinement is a central characteristic of Research and Development studies (Tegeh & Kirna, 2010). The validation process confirms that the integration of spinner-based randomization and movement instruction cards is pedagogically sound and appropriate for the developmental characteristics of upper elementary students.

The positive outcomes observed during the small-scale field trial further support the practical feasibility of the MASK learning model. Most students achieved performance scores within the good to very good categories, indicating that the instructional design effectively facilitated the execution of locomotor, non-locomotor, and manipulative skills. These findings are consistent with previous studies reporting that game-based and interactive learning environments enhance student engagement and motor performance in Physical Education

settings (Syafriadi et al., 2021; Prabowo et al., 2022). The observed increase in student enthusiasm and active participation suggests that the use of playful, structured media can reduce learning monotony, a recurring issue in elementary Physical Education instruction (Widiyatmoko & Hadi, 2018).

The large-scale field trial results provide stronger empirical evidence regarding the instructional effectiveness of the MASK learning model across multiple schools and learning contexts. The concentration of student performance scores within the good and very good categories indicates that the model consistently supports the development of fundamental movement skills for the majority of learners. This pattern of results aligns with the theoretical proposition that fundamental movement skills are more effectively developed when students are exposed to varied, meaningful, and enjoyable movement experiences rather than repetitive drills (Gallahue & Donnelly, 2003; Adi et al., 2022). The negatively skewed distribution observed in the large-scale trial suggests that the model was accessible to students with diverse ability levels, although a small proportion of learners may still require additional instructional support.

From a pedagogical perspective, the success of the MASK learning model can be attributed to several interrelated factors. First, the spinner mechanism introduces elements of randomness and anticipation, which are known to enhance motivation and sustained attention in learning activities (Firdaus, et.al, 2023). Second, the movement cards provide clear visual cues and concise instructions, reducing cognitive overload and supporting comprehension among elementary learners, who tend to benefit from concrete and visually rich learning materials (Junaidi, 2019; Wahyuningtyas & Sulasmono, 2020). These design features collectively contribute to a learning environment that is both structured and flexible, allowing teachers to manage instruction effectively while maintaining student interest.

The findings also resonate strongly with the concept of physical literacy, which emphasizes the integrated development of motivation, confidence, physical competence, knowledge, and understanding as foundations for lifelong engagement in physical activity (Roetert & Jefferies, 2014). The MASK learning model does not merely target psychomotor outcomes but also encourages cognitive engagement through conceptual questions and affective development through cooperative play and sportsmanship. This holistic orientation distinguishes the present study from prior interventions that focus predominantly on physical performance outcomes without explicitly addressing motivational or cognitive dimensions (Hasanah & Rodiah, 2021; Muslim, 2021).

Furthermore, the positive teacher evaluations observed during the large-scale trial underscore the practical relevance of the MASK model for classroom implementation. Teachers reported improved classroom dynamics, greater ease in organizing activities, and enhanced student responsiveness. These observations are consistent with previous research indicating that instructional media which align with teacher needs and classroom realities are more likely to be adopted and sustained in practice (Puspitarini and Hanif, 2023; Tuhuteru et al., 2022). The ability of the MASK model to function effectively across different school settings suggests that it possesses a degree of contextual adaptability, an important consideration in elementary education where resource availability and student characteristics may vary.

When compared with existing game-based Physical Education interventions, the MASK learning model offers a distinct contribution by systematically integrating three categories of fundamental movement skills within a single instructional framework. While prior studies have explored the use of traditional games or multimedia tools to enhance specific movement outcomes (Ananta & Syahara, 2025; Prabawa et al., 2021), few have combined randomization mechanisms, visual instruction cards, and physical literacy principles in a unified model. This integration addresses a notable gap in the literature and provides a practical response to calls for more innovative and comprehensive Physical Education learning designs (Hulteen et al, 2018; Zulfikar et al., 2021).

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Overall, the discussion of results up to the large-scale field trial stage indicates that the MASK learning model is pedagogically effective, theoretically grounded, and practically applicable. The consistency of positive outcomes across validation and field testing stages supports the argument that interactive, game-based learning media can significantly enhance fundamental movement skill development in elementary Physical Education. These findings reinforce the importance of innovative instructional design and highlight the potential of the MASK model as a scalable solution for improving the quality of Physical Education learning at the elementary level.

## CONCLUSION

This study set out to develop and evaluate the MASK learning model (Mengajar Ala Spinner dan Kartu) as an innovative instructional medium for improving fundamental movement skills among Phase C elementary school students. Based on the findings obtained up to the large-scale field trial stage, several conclusions can be drawn.

First, the MASK learning model was successfully developed through a systematic Research and Development process using the ADDIE framework. Expert validation results confirmed that the model met acceptable standards of content validity, instructional feasibility, and media appropriateness. Although some components required minor revisions, expert agreement indicated that the instructional content, movement structure, and media design were relevant and suitable for elementary Physical Education learning. Second, the results of the small-scale field trial demonstrated that the MASK model was practically feasible and well received by students. The majority of participants achieved performance levels categorized as good to very good, indicating that the model effectively facilitated the practice of locomotor, non-locomotor, and manipulative skills. Observational data further showed increased student enthusiasm, active participation, and positive classroom interactions, suggesting that the game-based approach successfully reduced instructional monotony commonly found in Physical Education learning. Third, the large-scale field trial provided stronger empirical evidence of the model's instructional effectiveness across multiple schools and learning contexts. Student performance scores were predominantly concentrated in the good and very good categories, indicating consistent improvement in fundamental movement skills among most participants. Teacher evaluations also highlighted improvements in student motivation, classroom management, and engagement. These findings suggest that the MASK learning model is not only effective in controlled settings but also adaptable and applicable across diverse elementary school environments.

Overall, the findings indicate that the MASK learning model constitutes a valid, practical, and effective alternative for elementary Physical Education instruction, particularly in supporting the development of fundamental movement skills within a physical literacy-oriented framework. By integrating psychomotor practice with cognitive understanding and affective engagement, the model contributes to more holistic and meaningful learning experiences for elementary students. While the present conclusions are limited to results obtained up to the large-scale field trial stage, the evidence strongly supports the potential of the MASK model to enhance the quality of Physical Education learning at the elementary level. Future research is recommended to extend the evaluation of this model through experimental effectiveness testing and longitudinal studies to examine its long-term impact on physical literacy, physical activity habits, and student well-being.

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