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Laloju Game Development To Improve Basic Locomotive Movements

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ABSTRACT

This development research was motivated by the challenges faced by Physical Education, Sports, and Health (PJOK) learning at Salumoni Elementary School, which is still dominated by conventional models based on direct instruction and drills. This approach leads to low learning motivation and student engagement, as well as suboptimal mastery of basic locomotor movements, particularly walking, running, and jumping. Therefore, this study aims to develop a valid, practical, and effective LALOJU (Run, Jump, Champion) game model to improve basic locomotor skills in elementary school students. This study employed a Research and Development (R&D) method, adopting the 4D model (Define, Design, Development, Dissemination). The product developed is a LALOJU Game Model Guidebook, which consists of four types of games: Diamond Kangaroo, Animal Racing, Safety Pole, and Life Ball. These games are designed based on the principles of learning by playing and are developmentally appropriate. The research subjects included material experts, media experts, and practitioners (PJOK teachers), as well as students at SD Inpres Salumoni in small-scale trials (25 first-grade students) and large-scale trials (32 third-grade students). Validation results showed that the product received a very good/suitable for use category from media experts (94.23%) and practitioners (96.15%), and a good/suitable for use category from material experts (88.46%). The large-scale trial also showed a good/suitable for use category with a percentage of 89.06%. These findings indicate that the LALOJU game model meets the criteria for validity, practicality, and effectiveness and is capable of improving the quality of PJOK learning through active, enjoyable, and meaningful basic locomotor movement learning experiences for elementary school students.

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A. Conception and design of the study;
B. Acquisition of data;
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INTRODUCTION

Physical Education, Sports, and Health (PJOK) is a strategic component of the national education system because it plays a direct role in developing students' physical fitness, motor skills, character, and emotional balance. At the elementary school level, the primary focus of PJOK is on mastering Fundamental Movement Skills (FMS), which encompass locomotor, non-locomotor, and manipulative movements, as a foundation for lifelong

physical activity participation. Good mastery of FMS has been shown to significantly contribute to children's readiness to participate in more complex sports activities, improve fitness, and foster an active and healthy lifestyle (Logan et al., 2018; Barnett et al., 2022).

However, the implementation of PJOK learning in elementary schools still faces various challenges. Initial observations and semi-structured interviews with PJOK teachers at Salumoni Elementary School indicate that basic locomotor movement learning is still dominated by a conventional, direct-instruction-based model. This learning pattern places the teacher at the center of the activity, while students engage in repetitive movements in drills with minimal game context. These conditions make learning less engaging, decrease motivation, and limit students' exploration and creativity in movement. Consistent with previous empirical findings, monotonous learning approaches have been shown to contribute to low levels of active engagement and motor development in elementary school-aged children (Lubans et al., 2016; Rudd et al., 2020).

This problem becomes even more crucial given the developmental characteristics of elementary school children, which require concrete, contextual, and enjoyable learning experiences. Without innovative, adaptive learning models, the goal of Physical Education (PJOK) to optimally develop basic movement competencies is likely to be unattainable.

Several studies over the past decade have confirmed that game-based PJOK learning is more effective than conventional approaches in improving students' motor skills, motivation, and active participation (Metzler, 2017; Casey & MacPhail, 2018). Models such as Teaching Games for Understanding (TGFU), Game Sense, and Play-Based Learning have been widely implemented to simultaneously integrate cognitive, affective, and psychomotor aspects. Research shows that a game-based approach can create a meaningful learning environment and encourage emotional engagement in students (Harvey et al., 2018; Stolz & Pill, 2019).

In the context of developing a game-based learning model (FMS), several empirical studies have reported that systematically designed, structured games can significantly improve locomotor skills such as running, jumping, and hopping (Morgan et al., 2015; Brian et al., 2019). Recent studies in Indonesia also confirm that game modifications in physical education (PJOK) learning have a positive impact on improving basic movement skills and learning motivation in elementary school students (Sari et al., 2024; Kusumawati et al., 2023).

However, most of the game models developed are still general and not fully contextualized to the characteristics of specific students and school environments. Furthermore, there is limited research and development (R&D) that produces structured locomotor game products with clear implementation guidelines and systematically tested for validity, practicality, and effectiveness.

Based on the literature review and empirical conditions in the field, several research gaps can be identified. First, there are still limited physical education (PJOK) game models specifically focused on developing basic locomotor movements, with simple, applicable designs that are appropriate to the characteristics of elementary school students in Indonesia. Second, some previous research has focused more on measuring learning outcomes without developing learning products that can be replicated by teachers in other

schools. Third, there is a lack of game models that integrate competitive and educational elements in a balanced way, thereby improving motor skills as well as student motivation and engagement holistically.

This gap indicates the need to develop innovative game-based learning models that are not only effective motorically, but also pedagogically and contextually relevant.

In response to these issues and research gaps, this study aims to develop the LALOJU (Run, Jump, Champion) game as a game-based PJOK learning model to improve basic locomotor movement skills of elementary school students at SD Inpres Salumoni. Specifically, this study aims to: (1) produce a theoretically and practically valid LALOJU game design, (2) test the practicality of implementing the game in physical education (PJOK) learning, and (3) analyze the effectiveness of the LALOJU game in improving students' basic locomotor skills.

The novelty of this research lies in the development of a structured, contextual, and learning-by-play-oriented locomotor game, integrating elements of positive competition appropriate to children's developmental characteristics. The LALOJU game functions not only as a physical activity but also as a pedagogical medium that encourages motivation, movement creativity, and active student engagement. Therefore, this study is expected to provide theoretical contributions to the development of PJOK learning models and practical contributions for teachers in improving the quality of basic movement learning in elementary schools.

METHODS

This research employed a research and development (R&D) approach, adapting the 4D model (Define, Design, Development, Dissemination) developed by Thiagarajan and popularized in an educational context by Mulyatiningsih (2016). The 4D model was chosen because it is systematic, flexible, and widely used in the development of physical education (PJOK) learning products oriented towards improving students' motor skills (Akker et al., 2013; Plomp, 2019; Branch, 2015).

The Define stage aims to identify the needs and challenges of PJOK learning, specifically the development of basic locomotor movements. The needs analysis was conducted through a review of current literature related to fundamental movement skills, play-based learning, and the characteristics of motor development in elementary school-aged children (Logan et al., 2018; Barnett et al., 2022; Rudd et al., 2020). Additionally, initial observations and semi-structured interviews were conducted with physical education teachers at SD Inpres Salumoni to identify gaps between ideal conditions and actual learning practices. The results of this stage were used to establish product specifications, namely the LALOJU (Run, Jump, Champion) game, as a game-based learning model targeting the improvement of basic locomotor skills.

The Design stage focused on developing the conceptual and operational design of the LALOJU game. The design included learning objectives, game flow, rules, activity scenarios, and indicators for locomotor (running and jumping) achievement. The principles of learning by playing and developmentally appropriate practice were used as the pedagogical

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foundation to ensure the game was suited to the characteristics of lower-grade elementary school students (Metzler, 2017; Casey & MacPhail, 2018; Brian et al., 2019). Assessment instruments were also developed at this stage, including an expert validation sheet and a rubric for observing locomotor skills.

The Development stage was the core of the research, transforming the design into a LALOJU game product ready for testing. The developed product was validated by three validators: one physical education (PJOK) subject matter expert, one instructional media expert, and one PJOK teacher as a practitioner. Validation was conducted to assess aspects of content, construction, clarity of rules, safety, and feasibility of implementation (Akker et al., 2013; Nieveen & Folmer, 2018). Product revisions were carried out iteratively based on validator input until a valid product was obtained.

Following validation, a limited trial was conducted to assess the product's practicality and initial effectiveness. The small group trial involved 25 first-grade students, while the large group trial involved 32 third-grade students at SD Inpres Salumoni. Data collection was conducted through observations of basic locomotor skills and student responses to learning. This approach aligns with previous development research that emphasizes the importance of phased trials to ensure the quality of learning products (Plomp, 2019; Sugiyono, 2020).

The dissemination phase was conducted on a limited basis by socializing the LALOJU game product to physical education teachers at SD Inpres Salumoni through discussions and providing user guides. This phase aimed to ensure the product could be implemented sustainably and replicated in similar physical education learning contexts (Branch, 2015; Harvey et al., 2018).

Overall, the application of the 4D model in this study is expected to produce a LALOJU game product that is valid, practical, and effective in improving elementary school students' basic locomotor skills, while also providing a methodological contribution to the development of game-based physical education learning models.

RESULTS AND DISCUSSION

Result

This development research resulted in the LALOJU (Run, Jump, Champion) game model, packaged in the form of a Game Guidebook. It consists of four types of locomotor games: Diamond Kangaroo, Animal Racing, Safety Pole, and Ball of Life. Product development followed the 4D model procedure (Define, Design, Development, Dissemination). The development phase resulted in a product that was then validated by experts and piloted with students to assess validity, practicality, and effectiveness.

Table 1.
LALOJU Game Product Feasibility Results

Assessment Subject	Percentage (%)	Eligibility Category
Media Expert	94,23	Excellent / Suitable for Use
Material Expert	88,46	Good / Suitable for Use
Practitioner (PJOK Teacher)	96,15	Very Good / Suitable for Use
Small Group Trial	86,38	Good / Suitable for Use
Large Group Trial	89,06	Good / Suitable for Use

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Expert Validation Results

The validation results showed that the media expert gave a feasibility score of 94.23%, categorized as very good. This assessment indicates that the game's design, rule clarity, visualization, and safety and ease of use meet the standards for physical education (PJOK) learning media. The material expert gave a score of 88.46%, categorized as good, indicating that the game's content aligns with the PJOK learning objectives, the characteristics of basic locomotor movements, and the developmental stages of elementary school students. Meanwhile, the PJOK teacher practitioner gave the highest score of 96.15%, categorized as very good, indicating that the LALOJU game is easy to implement, relevant to classroom conditions, and supports active and enjoyable learning.

Input and suggestions from the validators were used as the basis for product revisions, particularly in simplifying game instructions and strengthening the activity flow to make it more systematic and adaptable to student abilities.

Product Trial Results

The small group trial involved 25 first-grade students at SD Inpres Salumoni and resulted in a feasibility score of 86.38%, categorized as good. These results indicate that the LALOJU game can be effectively implemented in small groups, is easily understood by students, and increases engagement and enthusiasm in locomotor movement activities.

Furthermore, a large-group trial involving 32 third-grade students showed an increase in scores to 89.06%, remaining in the good category. This improvement reflects that the LALOJU game is not only consistently implemented but also effective when applied to larger, more heterogeneous groups of students. Students demonstrated active participation, improved motor coordination, and a more engaging and meaningful learning experience.

Summary of Findings

Based on the results of expert validation and field trials, it can be concluded that the LALOJU game meets the criteria for validity, practicality, and effectiveness in improving elementary school students' basic locomotor movement skills. These findings reinforce the fact that a structured and contextual game-based Physical Education (PJOK) learning model is capable of creating optimal learning experiences and supporting the sustainable achievement of basic movement learning objectives.

Discussion

The research results show that the development of the LALOJU (Run, Jump, Champion) game positively contributed to improving the basic locomotor skills of students at Salumoni Elementary School. This finding supports the theoretical view that basic locomotor skills, particularly running and jumping, will develop optimally when provided through varied, progressive, and physically challenging activities, yet still packaged in a fun playful context and appropriate to the developmental characteristics of elementary school-aged children (Rahmawati, 2024; Barnett et al., 2022; Logan et al., 2018).

Conceptually, the LALOJU game is designed based on the principles of learning by playing and developmentally appropriate practice, which emphasize the appropriateness of

activities to the child's motor, cognitive, and affective developmental stages. This approach has proven effective in creating meaningful learning experiences because students not only perform movements mechanically but also engage emotionally and socially in the learning process (Metzler, 2017; Casey & MacPhail, 2018). This aligns with motor learning theory, which states that varying tasks and movement contexts can enrich children's motor repertoire and enhance skill transfer to more complex physical activity situations (Rudd et al., 2020; Robinson et al., 2015).

From an empirical perspective, the high validation scores from media experts, content experts, and teacher practitioners indicate that the LALOJU game meets the appropriateness of content, design, and learning implementation. High validity indicates that the game's structure, rules, and activity flow align with the objectives of Physical Education (PJOK), specifically the development of basic locomotor movements. This finding is consistent with previous development research, which suggests that systematically validated PJOK learning products tend to be more effective when implemented in the field (Nieveen & Folmer, 2018; Plomp, 2019).

Furthermore, the results of small-group and large-group trials indicate that the LALOJU game falls into the "good/suitable for use" category, with a trend toward increased scores in the larger group. This indicates that the game model is not only practical to implement but also stable and consistent when used with a larger and more heterogeneous group of students. These findings support the research of Hidayat et al. (2021), which stated that game-based physical education (PJOK) learning is more effective in improving neuromuscular coordination than monotonous drill training. Game activities allow for natural repetition of movements without causing boredom, allowing for optimal neuromuscular adaptation (Lubans et al., 2016; Brian et al., 2019).

Another advantage of the LALOJU game lies in its ability to increase student motivation and active engagement. In the context of physical education, intrinsic motivation is a key factor influencing active participation and the sustainability of children's physical activity (Deci & Ryan, 2017; Ntoumanis et al., 2020). Games like Diamond Kangaroo and Animal Racing provide positive competitive stimuli, while Safety Pole and Life Ball emphasize coordination and movement control. This combination creates a fun and challenging learning environment, encouraging students to move more actively and confidently in performing locomotor movements.

The findings of this study are also relevant to international literature, which confirms that mastery of basic locomotor movements at an early age has a long-term relationship with physical fitness levels, sports participation, and an active lifestyle in adolescence and adulthood (Barnett et al., 2016; Utesch et al., 2019). Therefore, the implementation of the LALOJU game not only impacts short-term learning outcomes but also has the potential to provide long-term benefits to students' physical development and health.

Overall, the results of this study strengthen the argument that a structured and contextual game-based PE learning model has advantages over conventional approaches. The LALOJU Game Guidebook developed has proven valid, practical, and effective in improving the basic locomotor movement skills of elementary school students. These

findings provide important implications for PE teachers to adopt and develop innovative learning models that align with student characteristics and curriculum demands, and enrich the body of developmental research in the field of physical education.

CONCLUSION

Based on the research results and discussion, it can be concluded that this development research has successfully produced the LALOJU (Run, Jump, Champion) Game Model Guidebook as a Physical Education (PJOK) learning innovation oriented towards improving students' basic locomotor skills at Salumoni Elementary School. The developed game model consists of four main activities: Diamond Kangaroo, Animal Racing, Safety Pole, and Ball of Life. These are systematically designed to stimulate locomotor skills through a playful learning approach that aligns with the developmental characteristics of elementary school students.

Conceptually, the LALOJU game integrates the principles of game-based learning and developmentally appropriate practice, creating an active, enjoyable, and meaningful learning experience. Empirically, validation results indicate that the product has a high level of feasibility, with media experts (94.23%) and teacher practitioners (96.15%) categorizing it as very good/suitable for use, and material experts (88.46%) categorizing it as good/suitable for use. The trial results also indicated that the LALOJU game was practical in small-scale trials (86.38%) and effective in large-scale trials (89.06%) in improving students' basic locomotor skills.

Thus, it can be confirmed that the LALOJU game model meets the criteria of validity, practicality, and effectiveness, and is suitable for implementation as an alternative physical education (PJOK) learning model to improve the quality of basic locomotor learning in elementary schools.

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from these validators served as a crucial foundation for improving the product, ensuring it met the criteria for validity, practicality, and effectiveness.

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