

Stimulation of motor skills through game models in early childhood and elementary school students: systematic review in Indonesia

Estimulación de las habilidades motrices mediante modelos de juego en alumnos de educación infantil y primaria: revisión sistemática en Indonesia

*Didi Suryadi, *Ahmad Nasrulloh, **Novi Yanti, ***Ramli, ****Lazuardy Akbar Fauzan, *BM. Wara Kushartanti, *Sumaryanti, *Bernadeta Suhartini, *Eka Swasta Budayati, *Novita Intan Arovah, ****Mashud, *****Mikkey Anggara Suganda, *Sumaryanto, *Panggunng Sutapa, *****Nagoor Meera bin Abdullah, *Ella Fauziah
 *Universitas Negeri Yogyakarta, (Indonesia), **Universitas Tanjungpura, (Indonesia), ***Universitas Negeri Makasar, (Indonesia), ****Universita Lambung Mangkurat, (Indonesia), *****Universitas Nahdlatul Ulama Cirebon, (Indonesia), ***** Universiti Teknologi MARA, (Malaysia)

Abstract. Background and purpose of the study. The relevance of motor skills for every student since they have benefits and affect the overall development of kids. Several studies have offered data on learning and developing motor abilities in youngsters. The game model's information is extensively created and utilized as a reference to enhance gross motor abilities. As a result, the purpose of this study is to conduct a review of the scientific literature in Indonesia on the stimulation of motor skills in early childhood and primary school students through learning using game models. The Harzing Publish or Perish tool was utilized for the search in this study. A database (Scopus) was utilized to find publications on motor skill development through play-based learning. The search was carried out in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) recommendations. Only five items remained after the exclusion criteria were applied. The findings indicate that the research methods employed in cooperative learning research in Indonesia are various, including quantitative, mixed research (quantitative and qualitative), and development. On average, measuring equipment was utilized to collect data for the study. According to the findings of this review, in the first group, traditional play-based children's learning is capable of optimizing kindergarten children's basic motor development, with a track record of implementing the concept/theoretical basis, activity stages, social systems, reaction principles, support systems, and impact models, and increasing students' basic skills for high motor skills. In the second category, learning structured in the form of games may stimulate children's fine motor and cognitive abilities, as well as strengthen fundamental motor skills and build gross motor skills for use in the learning process. Some shortcomings in the review have been identified, and it is important to continue this study internationally with a literature review or mapping study (bibliometric and scientometric), as well as to conduct research on the use of the game model and its impact.

Keywords: Motor skills, play model, early childhood, elementary school

Resumen. Antecedentes y objetivo del estudio. La relevancia de las habilidades motrices para todo estudiante, ya que tienen beneficios y afectan al desarrollo general de los niños. Varios estudios han ofrecido datos sobre el aprendizaje y el desarrollo de las habilidades motrices en los más pequeños. La información del modelo de juego es ampliamente creada y utilizada como referencia para potenciar las habilidades motrices gruesas. En consecuencia, el propósito de este estudio es llevar a cabo una revisión de la literatura científica en Indonesia sobre la estimulación de las habilidades motoras en los alumnos de educación infantil y primaria a través del aprendizaje mediante modelos de juego. Para la búsqueda en este estudio se utilizó la herramienta Harzing Publish or Perish. Se utilizó una base de datos (Scopus) para encontrar publicaciones sobre el desarrollo de habilidades motoras mediante el aprendizaje basado en el juego. La búsqueda se realizó de acuerdo con las recomendaciones Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Tras aplicar los criterios de exclusión, sólo quedaron cinco artículos. Los resultados indican que los métodos de investigación empleados en la investigación del aprendizaje cooperativo en Indonesia son diversos, incluyendo la investigación cuantitativa, mixta (cuantitativa y cualitativa) y el desarrollo. Por término medio, se utilizaron equipos de medición para recoger datos para el estudio. Según las conclusiones de esta revisión, en el primer grupo, el aprendizaje infantil tradicional basado en el juego es capaz de optimizar el desarrollo motor básico de los niños de jardín de infancia, con un historial de aplicación del concepto/base teórica, las etapas de actividad, los sistemas sociales, los principios de reacción, los sistemas de apoyo y los modelos de impacto, y de aumentar las habilidades básicas de los alumnos para la motricidad alta. En la segunda categoría, el aprendizaje estructurado en forma de juegos puede estimular la motricidad fina y las capacidades cognitivas de los niños, así como reforzar las habilidades motrices fundamentales y desarrollar las habilidades motrices gruesas para su uso en el proceso de aprendizaje. Se han identificado algunas deficiencias en la revisión, y es importante continuar este estudio a nivel internacional con una revisión de la literatura o un estudio de mapeo (bibliométrico y cienciométrico), así como realizar una investigación sobre el uso del modelo de juego y su impacto.

Palabras clave: Habilidades motrices, modelo de juego, primera infancia, escuela primaria

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Didi Suryadi

didisuryadi.2023@student.uny.ac.id

Introduction

Motor skills are now a well researched issue from a variety of angles (Fernandes et al., 2016; Ghassabian et al., 2016; Kenny, Hill, & Hamilton, 2016; Libertus & Hauf, 2017). The prevalence of adolescents facing challenges with motor skills is on the rise (Plumb, Hands, McIntyre, &

Timler, 2021). Furthermore, motor skills are critical to child development (Lucas et al., 2016), and (Gustian, 2021) supports this statement by stating that every student must have adequate motor skills in order to aid their entire growth. The requirement to strengthen preschool children's basic motor abilities will aid in the learning process (García-Marín & Fernández-López, 2020). As a result,

physical education is one of the most essential courses to teach in elementary schools (van Kernebeek, de Kroon, Savelsbergh, & Toussaint, 2018), and is required of all pupils (Haïdara, Okilanda, Dewintha, & Suryadi, 2023; Rubiyatno et al., 2023).

Every student should have motor skills as these skills are beneficial and impact the entire development of the child. Movement activities improve cardiorespiratory system fitness (Cohen et al., 2015), metabolic and neuromuscular system performance (Laukkanen, Pesola, Havu, Sääkslahti, & Finni, 2014), and they cause positive changes in physiological and anthropometric indices of health in normal weight and obese students (Lambrick, Westrupp, Kaufmann, Stoner, & Faulkner, 2016), as well as determinants of fitness in adolescence (Barnett et al., 2008).

Family, social environment, and school environment have a major impact on the growth and development of primary school-age children (Hu, Wu, & Kong, 2022), and it also encourages children's physical fitness and motor development (Hu et al., 2022). Furthermore, instructors play a significant role in offering services to develop motor skills in the school setting. Knowing the stages of student development is essential so that the phases of motor skills may all be carried out and the phase is mastered according to the student's age level (Samodra et al., 2023). Children's gross motor movements must be adequately developed in order for them to have strong hard skills in the future (Gustian, 2021).

The ability of kids to learn from their experiences by engaging in physical activity is another advantage that can be realized. Children can explore their surroundings while engaging in movement activities, which will encourage cognitive growth and academic success (Fedewa & Ahn, 2011; Tandon et al., 2016), recognizing movement, awareness of the body, awareness of space, quality of movement, and the link between movement skills and limbs (Abels & Bridges, 2010). The existence of motor skills contributes to the enhancement of psychological and mental well-being (Caçola, Romero, Ibana, & Chuang, 2016), fostering positive outcomes in social and emotional development (Lobstein et al., 2015; Strong et al., 2005). Parents and teachers should take the advantages that students can gain from developing motor skills very seriously. Learning movement techniques helps students' cognitive, affective, and socioemotional capabilities as well as their ability to move.

Motor skills in primary school generally lead to basic motor skills (Ulrich, 2000). This is due to the fact that pupils in primary school are still in the basic movement stage of development and are only just starting to enter the specialised movement stage. Basic motions resemble stages that let pupils actively investigate their bodies' capacity for movement and grow as a result of discovering how to react to a stimulus in the form of motion control and movement abilities. Maturation, job demands, and environmental factors collectively exert a substantial influence on basic movements (Goodway, Ozmun, &

Gallahue, 2019). In the context of physical education, there is a customary focus on enhancing motor skills. The field of physical education serves to heighten the complexity of all learning by instructing students in activities that involve human movement (Campbell et al., 2009).

Lack of preparation, unclear goals and objectives, insufficient time for motor skill training, a lack of models and examples, and inappropriate equipment are the issues that arise in the execution of motor skill learning (Robinson & Goodway, 2009). The second issue is that most schools and parents place more emphasis on enhancing students' cognitive ability than they do on enhancing their motor skills, which negatively affects children with motor skill issues (Mahmud, 2019). Additionally, given that many kids have physical restrictions, the amount of time available for children to exercise at school is actually quite limited (Kremer, Reichert, & Hallal, 2012). Teachers fail to provide students with adequate motor skill development (Dyson, 2014). This should be gradual, socially relevant, and integrated into the setting of the teacher's own school (Dyson et al., 2016). Choosing the strategy for a learning process requires careful consideration of the teacher's role (Aziz, Okilanda, Permadi, et al., 2023; Aziz, Okilanda, Rozi, Suganda, & Suryadi, 2023; Mashud, Arifin, et al., 2023; Mashud, Warni, et al., 2023; Umar et al., 2023).

This systematic review's objective is to examine the scientific literature on the stimulation of young children's and elementary school students' motor abilities through game-based learning. Numerous studies have examined the advantages of games for enhancing kids' motor and physical abilities (Page, Barrington, Edwards, & Barnett, 2017). Nevertheless, each location has its own games that are tailored to the customs of the neighborhood and the setting in which students are housed (Akbari et al., 2009). Additionally, no one has particularly considered this systematic review in Indonesia till 2023. In addition, the importance of this study is driven by the need to understand the development of children's motor skills in Indonesia, given the role of motor skills in children's holistic growth and development. This literature study will provide in-depth insights into specific factors that may influence children's motor skills in the Indonesian context, including genetic, environmental and educational aspects. As a result, this is one of the potential gaps and justifies the necessity of doing this study.

Materials and Methods

Search Strategy

The search in this study used the Harzing Publish or Perish application. The search begins with the Scopus database, which is regarded as one of the main citation indexing systems (Samsuddin, Shaffril, & Fauzi, 2020). Where the source is most often viewed by previous researchers worldwide. The strategy of the search included a combination of keyword variations ("game" OR "game model" OR "motor

skills" AND "elementary school"). The search was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. (Mohamed Shaffril, Samah, Samsuddin, & Ali, 2019). PRISMA also emphasizes review reports that evaluate randomized trials that can also be used (Moher, Liberati, Tetzlaff, & Altman, 2009).

Exclusion Criteria

Exclusion criteria used were as follows: (1) The articles were not published in journals indexed in Scimago Journal Rank (SJR), (2) the language other than English, (3) the published articles in a period other than the last 5 years, namely 2019-2023. (4) An article that did not explicitly mention the game model on the motor skills of elementary school students in Indonesia.

Prosedur

At the beginning, 682 publications were identified through database searches (Scopus: 112 articles). After adhering to the exclusion criteria, only 5 articles remained. Most of the articles were discarded as they did not mention game models on motor skills in Indonesia. All the articles were extracted from their sources and analyzed through Mendeley software to eliminate duplication of articles.

Results

The results of the literature review shown in Table 1 are described and discussed in one article. The country category is not shown because all articles are about the same country, Indonesia.

Table 1. Summary of Articles on Game Model Learning on motor skills

Author and Year	Research Methods and Types	Content	Research Objectives	Research Results
(Suherman, Dapan, Guntur, & Muktiani, 2019)	Development research, interview, observation, and document analysis	Traditional children's game-based learning model	To develop a learning model based on traditional children's games to optimize the development of basic motor skills in kindergarten children.	1) Play-based traditional children's learning for optimizing the basic motor development of kindergarten children consists of: (1) concept/theoretical basis, (2) activity stages, (3) social system, (4) reaction principles, (5) support system, and (6) impact model. 2. The traditional learning model based on children's play by experts and practitioners is a valid model.
(Saputra, Hanif, Sulaiman, & Ningrum, 2021)	Quantitative research, experiment, TGMD-2 instrument	Traditional game models and drills	To find out the difference between traditional games and drills that affect basic skills (running, jumping, overhand throwing, and catching) in elementary school.	1) Traditional games have a significant effect on improving students' basic skills for high motor skills. 2) Drill training has an effect on improving students' basic skills for low motor skills.
(Rukmini, Mustaji, & Mariono, 2022)	Pre-experimental research, one-group pre- and post-test	Playdough game model	To determine the effectiveness of playdough games in stimulating children's fine motor development and cognitive skills.	The results showed that playdough games can stimulate children's fine motor and cognitive skills.
(Dewi & Verawati, 2022)	Pre-experimental research, one-group pre- and post-test	Manipulative game model	To improve basic motor skills by using manipulative games	The results showed an increase in the basic motor skills of elementary school students through manipulative games.
(Sriwahyuniati, Hidayatullah, Purnama, Siswantoyo, & Tomoliyus, 2023)	Research mixed (quantitative and qualitative),	Game-based rhythmic gymnastics training model	To develop a game-based rhythmic gymnastics training model for elementary school students who make rhythmic gymnastics a compulsory program in their curriculum.	The game-based rhythmic gymnastics training models of jumping, rotation and balance games all showed high Aiken's "V" values, indicating the suitability of the models to be implemented in schools to develop gross motor skills.

Research Methods and Types

Based on a review of the category of research methods

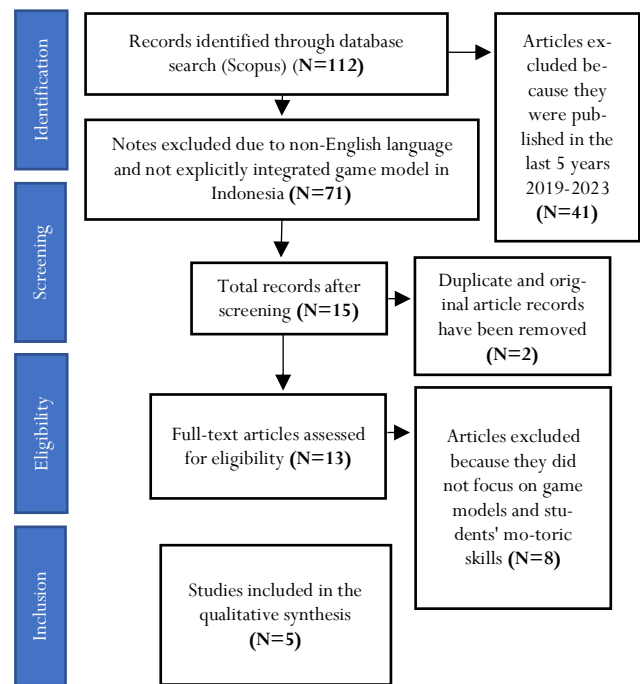


Figure 1. PRISMA Research Flowchart

and types, three articles exclusively used quantitative approaches (Dewi & Verawati, 2022; Rukmini et al., 2022; Saputra et al., 2021). Furthermore, one article uses mixed

research (quantitative and qualitative) (Sriwahyuniati et al., 2023), and another article uses development research (Suherman et al., 2019). The average article uses measurement instruments to collect research data.

Content

The results show a wide range of content implemented with game-based learning in Indonesia, such as: traditional children's game-based learning model (Suherman et al., 2019), traditional game and drill model (Saputra et al., 2021), playdough game model (Rukmini et al., 2022), manipulative game model (Dewi & Verawati, 2022), and game-based rhythmic gymnastics training model (Sriwahyuniati et al., 2023). Furthermore, content related to sports (Sriwahyuniati et al., 2023) such as rhythmic gymnastics, traditional games and drills (Saputra et al., 2021). Other values are closely related to fine motor skills (Rukmini et al., 2022), traditional approaches (Suherman et al., 2019) and manipulatives (Dewi & Verawati, 2022). In sports education, especially for children, the game model is considered the most effective in improving motor skills. However, it should be understood that not all provide valid results. As has been done by (Suherman et al., 2019) in their research on 87 identified traditional children's games, 23 of these games can be used to develop basic motor skills. This is certainly done by remembering that traditional children's toys have values and elements of motion that are in accordance with the needs of children's basic skill development. This is supported by earlier studies, which found that elementary school pupils are still taught using methods that correspond to their developmental stages (Kostelnik, Soderman, & Whiren, 2017), and in accordance with the degree of the kids' motor skills (Campbell et al., 2009).

Research Objectives and Results

Based on this review, we can see that the research objectives and results they developed are divided into two groups:

Learning models of traditional children's game-based learning models and traditional game and drill models: In this first group, there are two articles that discuss traditional children's game-based learning models (Suherman et al., 2019), and traditional games and drills (Saputra et al., 2021). The first article aims to develop a traditional game-based learning model to optimize the basic motor development of kindergarten children. The results showed that (1) Traditional game-based learning to optimize the basic motor development of kindergarten children consists of: concept/theoretical basis, activity stages, social system, reaction principles, support system, and impact model. (2) The model of traditional game-based learning to optimize the basic motor development of kindergarten children according to experts and practitioners is a valid model. (Suherman et al., 2019). The second article aims to determine the difference between traditional games and drills that affect basic skills (running, jumping, overhand throwing, and catching) in elementary schools. Results (1) Traditional games have a

significant effect on improving students' basic motor skills. (2) Drill training has an effect on improving students' basic skills for low motor skills (Saputra et al., 2021). As shown by (Gustian, 2021) that traditional games are proven to stimulate motor skills.

Playdough game model, manipulative game model, and game-based rhythmic gymnastics training model: In this second group, there are three articles that discuss playdough game models (Rukmini et al., 2022), manipulative game models (Dewi & Verawati, 2022), and game-based rhythmic gymnastics training models (Sriwahyuniati et al., 2023). The first article aims to determine the effectiveness of playdough games in stimulating children's fine motor development and cognitive skills. The research results prove that playdough games can stimulate children's fine motor and cognitive skills (Rukmini et al., 2022). The second piece also tries to enhance fundamental motor abilities through manipulative activities. The findings indicated that manipulative games improved the basic motor skills of elementary school kids (Dewi & Verawati, 2022). The third article aims to develop a game-based rhythmic gymnastics training model for elementary school students who make rhythmic gymnastics a mandatory program in their curriculum. The results of the research provide information that the game-based rhythmic gymnastics training model, namely jumping, rotation, and balance games, all show high Aiken's "V" values, indicating the suitability of the model to be applied in schools to develop gross motor skills (Sriwahyuniati et al., 2023).

The goal of this article is to describe research on play-based motor skills learning in early childhood and primary school students in Indonesia. For this purpose, only research articles published in Indonesia were reviewed. Based on this review, the articles were divided into five categories namely (i) Author and Year, (ii) Research Method and Type, (iii) Content, (iv) Research Objectives, and (v) Research Results. The category of country is not shown, as all articles focus on one country, Indonesia. The review is divided into two groups, (i) learning models of traditional children's game-based learning models and traditional game and drill models, (ii) playdough game models and manipulative game models and game-based rhythmic gymnastics training models.

This review shows that in the first group, play-based traditional children's learning is able to optimize the basic motor development of kindergarten children, with a record of implementing the concept or theoretical basis, activity stages, social systems, reaction principles, support systems, and impact models (Suherman et al., 2019), and improving students' basic skills for high motor skills (Saputra et al., 2021). In the second group, through learning designed in the form of games, it can stimulate children's fine motor and cognitive skills (Rukmini et al., 2022), improve basic motor skills (Dewi & Verawati, 2022), and develop gross motor skills so that they can be applied in the learning process (Sriwahyuniati et al., 2023).

From the findings above, it can be seen that the game

model is very well applied in learning to stimulate motor skills in children. Other researchers have also explained in their research findings that learning designed in a game can also develop game performance (Harianto, Gustian, Supriatna, Shalaby, & Taiar, 2023), increase physical fitness (Ahmad, Septiyawan, & Puspitaningsari, 2023), and of course this will have a positive effect on motor skills in children (Samodra et al., 2023). In addition, learning with game design also helps children with special needs (Salam, Rismayanthi, Krismantoro, & Kurniawan, 2023). The limitation of this research lies in the database used, which only takes research from the Scopus database. Of course, there are many more reliable databases, such as Web of Science (WoS), Emerald, and others.

Conclusions

This review has contributed by updating the literature on play-based learning to improve motor skills in Indonesia. Initially, many of the studies were found, but after applying the exclusion criteria, the number was reduced to five articles. The results show that the number of studies on play-based learning in early childhood and primary school in Indonesia is still very small and indicates the need to translate theory into educational practice. To explore the need to promote consistent research that can generate new knowledge about the real possibilities of implementing play-based learning for motor skills in young children. The result shows that the types of research used in learning research to stimulate motor skills in Indonesia with play models are quantitative, mixed research (quantitative and qualitative), and development. The average article used measurement instruments for data collection. The results of this review show that in the first group, traditional game-based children's learning is able to optimize the basic motor development of kindergarten children, with a record of implementing the concept/theoretical basis, activity stages, social systems, reaction principles, support systems, and impact models and improving children's basic abilities for higher-level motor skills. For the second group, learning designed in the form of games can stimulate children's fine motor and cognitive skills, improve basic motor skills, and develop gross motor skills so that they can be applied in the learning process. The next researcher can add other keywords and databases such as ERIC, EBSCO (SPORTDiscus and Psychology & Behavioral Sciences Collection), and other databases when searching for articles. It is necessary to continue this research further globally with a literature review or mapping study (bibliometrics and scientometrics), and also something needs to be done about the application of the game model and its impact.

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Conflict of interests

There is no conflict of interest.

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