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Development of a Kids Athletics Training Model to Improve Motor Skills in Children Aged 7–8 Years

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Abstract

The low level of motor skills among elementary school children in Indonesia is a major concern, especially during the critical developmental phase of ages 7-8. This phenomenon is exacerbated by the increase in sedentary lifestyles due to technology and the lack of attractive, structured physical activities that are in line with child development principles. The implementation of existing kids athletics programs tends to be unsystematic and fails to accommodate the aspects of happiness and active participation. Therefore, this study aims to develop an effective, enjoyable, and structured kids athletics training model to improve the motor skills of 7-8-year-old children. The method used is Research and Development (R&D) by adopting the Borg and Gall model, involving 30 students from SDN 1 Sukoharjo 2 as research subjects. The development process includes the stages of needs analysis, product design, expert validation by three experts (learning, athletics, and coaching experts), and gradual field trials (small and large scale). The final model consists of six game activities divided into three categories of basic athletic movements: running (obstacle course and agility ladder), throwing (turbo throw and accuracy throw), and jumping (precision jump and agility ladder jump). Expert validation results showed a very high level of feasibility with an average score of 94.89%. Field trials on a small and large scale obtained feasibility percentages of 92.67% and 94.58%, respectively. Pretest-posttest results showed a significant improvement in students' motor skills, with the average score rising from 1.7 to 3.17. A dependent t-test confirmed a significant effect ($t = 11.406 > t_{table}\ 2.042$; $p = 0.001 < 0.05$). The conclusion of this study is that the developed kids athletics training model is proven to be effective, feasible, and enjoyable for improving the motor skills of 7-8-year-old children. This model not only successfully integrates child athletics pedagogical principles centered on students but also provides practical contributions as an innovative alternative in physical education learning in elementary schools.

Keyword: Training model; research and development (R&D); kids athletics; motor skills; elementary school children

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Introduction

Athletics is one of the subjects taught in Physical Education, Sports, and Health (PJOK) classes in schools from elementary school to high school (Putra & Bafirman, 2020). Athletics education, which has been introduced since elementary school age, will have a direct impact on motor skills (locomotor, non-locomotor, and manipulative) that are essential for children's development and growth (Rejeki & Gunawan, 2021). Motor skills are everything related to body movement. To develop motor skills, there are three determining factors: muscles, nerves, and the brain (Wang & Zhou, 2024). According to (Andriadi & Saputra, 2021), these three motor elements play their respective roles in a positive interaction, meaning that each element is interrelated, mutually supportive, and complementary to achieve a more perfect motor condition.

Motor development in children is a reflection of changes in the individual when interacting with the environment, involving coordinated muscles in the body through movement activities (Jakubík & Broďáni, 2025). Early childhood motor development is a fundamental aspect that forms the basis for the development of more complex motor skills in the future. In Indonesia, concerns about low motor skills in children have strong empirical basis. Data from the Basic Health Research (Riskesdas) shows that 26.1% of children aged 5-17 years in Indonesia have high sedentary behavior (sitting > 6 hours/day) (Kementerian Kesehatan Republik Indonesia, 2020).

Children aged 7-8 years are in a critical phase of motor development, where appropriate stimulation is essential for optimal coordination, balance, strength, and reaction speed (Gallahue, 2012:39). In addition, the motor development of elementary school-aged children is a fundamental aspect in supporting their physical, cognitive, and social growth. Good motor skills are the foundation for mastering various movement skills that are important for daily activities and future athletic achievements (Colak et al., 2024). Unfortunately, in this modern era, children's physical activity has declined due to the influence of technology and lifestyle changes, which has resulted in a decline in the quality of motor skills.

One approach that has proven effective in supporting motor development is through structured physical activities, such as kids athletics. Kids athletics is a modified form of athletics that has been adapted to be simpler, more interesting, and more appropriate for children's developmental stages. This program aims to train basic skills such as running, jumping, and throwing, which are the main foundations in the development of gross motor skills and are also enjoyable (Ababei, 2017). Meanwhile, according to (Rumini, 2020), kids athletics is a game designed by physical education experts as a means to stimulate and motivate children to be physically active, with an approach that resembles real athletics training.

Currently, the Kids Athletics program has spread widely to various schools throughout Indonesia. In fact, this sport has been competed in the Regional Student Sports Week (POPDA) at various levels, from sub-districts, regencies, to provinces. Although the kids athletics program has been widely introduced in Indonesia and various countries, the implementation of specific and structured training models for elementary school children in Indonesia is still very limited. In addition, the implementation of Kids Athletics in accordance with the rules of IAAF

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Kids' Athletics, now known as World Athletics Kids' Athletics, is a philosophy of early age athletics introduction built on several key pedagogical principles.

First, the principle of inclusivity ensures the active participation of all children, regardless of their ability level. Second, the program emphasizes the creation of fun and positive learning experiences to build intrinsic motivation. Third, the focus is on developing basic motor skills (running, jumping, throwing) through modified forms of activity, rather than on peak performance-oriented competition. Fourth, a team-based format is used to encourage cooperation, reduce individual anxiety, and increase social engagement. The final principle is minimal emphasis on winning, where the scoring system is designed to reward effort, improvement, and collective participation.

Children tend to enjoy learning while playing, but the high demands for achievement can make the many variations of exercises become boring and tiring activities. As a result, children are unable to continue the exercises until they reach their peak performance because they choose to stop practicing due to incorrect training patterns and methods from the start. This has the potential to reduce the effectiveness of the program in improving children's motor skills. Based on this background, this study aims to develop an effective athletic training model for children to improve the motor skills of elementary school children. It is hoped that this model can become an innovative alternative in physical education in schools and contribute to efforts to improve children's quality of life by strengthening basic motor skills.

Method

This study used the Research & Development method (Borg & Gall, 2005:92) to develop and validate a product in the form of an athletic training model for children aged 7-8 years. The research to develop the athletic training model for children used the research and development model from Borg and Gall, which consists of the following ten steps:

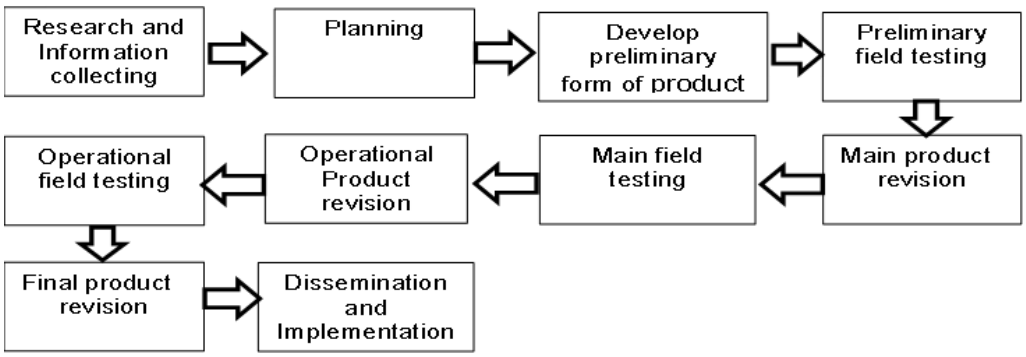

Figure 1. Stages of Borg and Gall Model Development

The data collection techniques in this study included product feasibility testing. Product testing was conducted on a small group consisting of students from SDN 1 Sukoharjo 2. This process was followed by a validation stage and testing on subjects. Validation was carried out by three experts, consisting of one athletic learning expert, one athletic expert, and one athletic training expert. The initial trial involved 7 male students and 8 female students. Meanwhile,

the product use trial involved 10 male students and 20 female students from SDN 1 Sukoharjo 2. Next, a validation questionnaire (survey) was distributed. The researchers presented numerical data obtained from expert assessments through questionnaires using a Likert scale, which were distributed to students participating in learning at SDN 1 Sukoharjo 2. The media questionnaire data was analyzed using assessments based on the Likert scale.

Table 1. Likert scale assessment

No	Response Category	Score
1	Strongly Agree / Very Positive	4
2	Agree / Positive	3
3	Disagree / Negative	2
4	Strongly Disagree / Never Occurred	1

From the results of the expert validity test, the model effectiveness test and prerequisite test consisting of normality test and hypothesis test were conducted. The researcher conducted interviews and observations with students regarding various types of Kids Athletics learning activities provided to them. The collected data served as a consideration in developing a Kids Athletics training model aimed at improving children's motor skills. Numerical data were obtained through surveys, questionnaires, or statistical studies. The assessment data collected by the researcher included questionnaires containing athlete responses related to the multimedia-based instructional media being developed. The percentage calculation of the collected data was processed using the following formula:

$$F = \frac{x}{N} X\,100\%$$

Information:
F = Expected percentage score
x = Total score given by the validator
n = Maximum possible score

Based on the percentage results obtained, the data were then classified to draw conclusions. The classification criteria are presented in the table below. Based on the percentage results obtained, the data were then classified to draw conclusions. The classification criteria are presented in the table below:

Table 2. Classification of assessment conclusion data

Percentage	Category	Meaning
0–30%	Very Poor	Discarded
30.1%–50%	Not Sufficient	Needs Improvement
50.1%–80%	Good	Can Be Used

Source: (Sugiyono, 2019)

The athletics training model for children developed in this study adapts the core principles of World Athletics Kids' Athletics, namely inclusivity, an emphasis on fun and skill

development, a team-based format, and minimal pressure to win. This model consists of nine structured activities grouped into three categories of basic athletics movements: running, throwing, and jumping. Each activity is designed as a game with modified rules, using safe and interesting equipment, and emphasizing the active participation of all team members.

A. Running Activities

1. Circuit Obstacle Course: A circuit-style running activity consisting of five stations: sprinting, zigzag running through cones, running over five low hurdles, zigzag running through stick bases, and ending with a sprint. This activity trains agility, speed, and coordination in overcoming various types of obstacles.
2. Sequential Agility Ladder Running: A team activity with five variations of foot patterns on an agility ladder, such as High Knee Run and Lucky Shuffle. Each team member takes turns completing one movement pattern before the team moves on to the next pattern, training rhythm, foot speed, and specific movement coordination.

B. Throwing Activities

1. Turbo Throw (Modified Javelin): An overhead throwing activity for individuals using a turbo javelin (modified javelin made from safe materials). The challenge is to throw the implement as far as possible over a 1-meter-high barrier, which trains basic technique, strength, and throwing angle.
2. Accuracy Target Throw: A group underhand throwing activity with two targets: hitting a picture target and throwing a tailed ball into a basket from a distance of 10 meters. This activity develops accuracy, control, and consistency of throwing motion.

C. Jumping Activities

1. Precision Target Jump: A team jumping activity toward a specific target, which is to land precisely on two mats and then jump into two hula hoops. This activity trains body control, landing accuracy, and jumping power.
2. Agility Ladder Jump: A team activity with five variations of jump patterns on an agility ladder, such as Two Hops and Hopscotch. Similar to running activities, each member completes one pattern in turn, which specifically trains explosive power, rhythm, and foot stability.

These six activities collectively form a coherent training model, where each unit is designed to accommodate the principles of Kids' Athletics. The predominance of group formats ensures inclusivity and cooperation. The integration of game elements creates a fun learning experience. Meanwhile, the variety of skill challenges focuses training on the development of basic motor skills, reducing the pressure of individual competition through a team-based scoring system or task mastery. Instructions: This rubric is used to assess movement quality in three skill components during Kids' Athletics activities. Give a score of 1-4 based on the description that best matches the child's performance.

A. Running

Table 3. Obstacle course & agility ladder running rubric

Score	Category	Description
4	Very Good	Excellent coordination and rhythm. Optimal running technique. Clears obstacles smoothly.
3	Good	Good coordination. Technique is visible, but inconsistent. Clears obstacles with minor errors.

2	Fair	Limited coordination. Minimal basic technique. Often makes mistakes when clearing obstacles.
1	Needs Guidance	Poor coordination. Technique is not visible. Often collides with/ignores obstacles.

B. Jumping

Table 4. Target jumping & agility ladder rubric

Score	Category	Description
4	Very Good	Stable and precise takeoff and landing. Optimal body control. Clear explosive power.
3	Good	Takeoff and landing are quite good. There is body control. Powerful jump.
2	Fair	Takeoff/landing is unstable. Limited body control. Flat jump.
1	Needs Guidance	Incorrect takeoff/landing technique. No body control. Minimal jumping power.

C. Throwing

Table 5. Turbo throw rubric & accuracy targets

Score	Category	Description
4	Very Good	Movement chain (legs–body–arms) is harmonious. Accuracy/consistency ≥75%.
3	Good	Movement chain is present, but not smooth. Accuracy 50–75%.
2	Fair	Movement is disjointed, relying solely on the arms. Accuracy 25–50%.
1	Needs Guidance	Movement is uncoordinated. Accuracy <25%.

Result

Based on the initial design, six Kids Athletics training models were developed. These training models were then validated by three experts: one expert in athletic learning, one in the field of athletics, and one in athletic coaching. The validation process resulted in a feasibility percentage from each expert, which served as the basis for determining the overall feasibility level of the product. The detailed validation results and suggestions from each validator are presented in the following table.

Table 6. Validators' suggestions for the training model

Validation Aspect	Validation Result	Information
Learning Expert	93.5%	Applicable
Athletics Expert	84.25%	Applicable
Athletics Coach	91.50%	Applicable

The assessments provided by the validators not only covered aspects of presentation feasibility, but also included several inputs and suggestions for improving the Kids Athletics training model. The details can be seen in the following table:

Table 7. Expert suggestions on the kids athletics training model

Validator	Suggestion Description
Learning Expert	The questionnaire is composed using proper and correct Indonesian language.

Athletics Expert	1. The name of the Kids Athletics Training Model should be revised. 2. Conduct systematically. 3. Provide further details and preparation for the revision phase.
Athletics Coach	Feasible for use.

The field test stages consisted of small group trials with a limited number of respondents, which were then followed by large group trials with a wider range of respondents. This step aimed to gather input as a basis for revising the final product as well as to assess the effectiveness of the developed product. Trials on large groups were conducted to determine the extent to which the product could be applied more widely and to obtain additional feedback before finalizing the product. Data from each athletic training model for children was then analyzed using percentage statistics and presented in tabular form. Based on the results of the small-scale trial shown in the table, it was found that the athletic training model for children could be applied to 10 students. This was supported by the questionnaire results, which showed an average suitability percentage of 92.67%, which is considered suitable or valid for use.

Table 8. Evaluation results of small scale test subjects

Training Model	Score	Information
1	95	Valid
2	100	Valid
3	90	Valid
4	92.5	Valid
5	95	Valid
6	92.5	Valid
7	87.5	Valid
8	92.5	Valid
9	90	Valid
10	90	Valid
11	92.5	Valid
12	90	Valid
13	95	Valid
14	87.5	Valid
15	100	Valid
Average		92.67%

Based on the results of large-scale trials presented in the following table, it is known that the athletic training model for children has been implemented in 30 students. These results were obtained through a questionnaire distribution, which showed an average feasibility score of 94.58%, thus declaring it valid and feasible for use.

Table 9. Evaluation results of large-scale test subjects

Training Model	Score	Information	Training Model	Score	Information
1	95	Valid	16	95	Valid
2	92.5	Valid	17	95	Valid
3	92.5	Valid	18	100	Valid
4	100	Valid	19	95	Valid
5	92	Valid	20	95	Valid
6	95	Valid	21	92.5	Valid
7	92.5	Valid	22	92.5	Valid
8	97.5	Valid	23	95	Valid

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9	90	Valid	24	100	Valid
10	90	Valid	25	100	Valid
11	100	Valid	26	95	Valid
12	95	Valid	27	100	Valid
13	100	Valid	28	92.5	Valid
14	95	Valid	29	95	Valid
15	92.5	Valid	30	95	Valid
	Average Score			94.58%	

Based on the results of the large-scale trial table above, it shows that out of 30 students, the kids athletics training model has been implemented. This is in accordance with the results of the questionnaire that has been distributed, obtaining an average validity score of 94.89%. Next, the effectiveness of the kids athletics training model was tested on 30 students by conducting an initial motor skills test. The students carried out the kids athletics training program in accordance with the validated model and then took a post-test. The results are shown in the following table:

Table 10. Pretest and Posttest

No	Name	Pretest	Post test
1	Al Zhea Zanita Rizky	1	3
2	Andhara Makaila Putri	4	4
3	Aysha Zakauha Mufida	2	3
4	Azalea Satabera Jingga	1	1
5	Daffa Alfarizi	1	2
6	Devin Aprilio	2	4
7	Fathur Sabastian Dwi Saputra	1	2
8	Gilang Azzmy Ramadhan	2	3
9	Muhammad Al Ghazali	1	2
10	Olivia Agestu	1	3
11	Rafa Ihsan Syahreza	2	4
12	Raffi Adhi Ya'ul Haq	2	3
13	Robby Setiawan	2	4
14	Agnes Kanaya Noell Ta	1	3
15	Alrifai Fadgham Mulia	2	4
16	Angel Fransiska Putri Prasetya	2	3
No	Name	Pretest	Post test
17	Anggito Abi Manyu	1	3
18	Anindita Keisha Zahida	2	3
19	Aqifa Naila Putri	3	4
20	Arsyila Henna Savina	2	4
21	Azka Abyan Algifari	1	3
22	Diana Tri Astuti	2	3
23	Fiyora Febriyani	2	4
24	Michael Genta Benedictio	1	3
25	Mikaila Kiarani	2	3
26	Nadia	1	3
27	Nayla Aska Alesha	2	4
28	Zazkia Nur Azahra	2	4
29	Zidan Al Fakih	2	3
30	Arda Nayandra	1	3
	SUM	51	95
	Rerata	1,7	3,166667
	SD	0,690411	0,734091
	Varians	0,476667	0,538889

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Based on the data above, the average score for the initial motor test was 1.7 and the average score for the final motor test was 3.16. The standard deviation for the initial test was 0.69, while for the final test it was 0.73. The total score (sum) for the initial motor test was 51 and for the final test it was 95. Furthermore, the data was analyzed to test the hypothesis, by first fulfilling a number of analysis requirements so that the results obtained could be scientifically justified. These requirement tests included normality tests and hypothesis tests. The purpose of the normality test was to determine whether the data obtained from each variable analyzed actually followed a normal distribution pattern or not, along with the results of the normality test table.

Table 11. Normality test

No	Xi	Rerata	SD	Zi	F(zi)	S(zi)	IF(zi-S(zi)I
1	1	1,7	0,69	-1,01449	0,155174	0,25	0,09482616
2	2	1,7	0,69	0,434783	0,66814	0,5	0,16813989
3	3	1,7	0,69	1,884058	0,970221	0,75	0,22022143
4	4	1,7	0,69	3,333333	0,999571	1	0,00042906
						L table	0,381
						Lcount	0,22022143

From the data above, the calculated L value is 0.220 and the table L value is 0.381, so it can be concluded that the calculated L value < Ltabel, meaning that the data is normally distributed. Then, to clarify the influence between the independent variable and the dependent variable, an influence test was conducted, with the following results:

Table 12. Hypothesis test on the effect of the kids athletics training model on children's motor skills

Variabel	Mean	T table	P	α	Keterangan
Pretest	1,7	2.042	0.001	0.05	Signifikan
Posttest	3,16				

Based on the results of the statistical test analysis above, a significant difference was obtained between the initial and final tests of the Effect of the Kids Athletics Training Model on Children's Motor Skills. This is evidenced by a t-value of 11.406, which is greater than the t-table value of 2.042 (11.046 > 2.042) and a significance value of 0.001 < α = 0.05. Thus, H_0 is rejected and H_1 is accepted, which means that there is a difference in effect because the research results are statistically significant from the above calculations. It can be concluded that there is a significant effect of the Kids Athletics Training Model on Children's Motor Skills.

Discussion

This study developed and tested a kids' athletics training model designed to improve the motor skills of 7-8 year old children through a fun, systematic, and game-based approach. The

results of the trial showed a significant improvement, with the average motor skill score rising from 1.7 (pretest) to 3.17 (posttest), supported by a t-value of 11.406 greater than the t-table value of 2.042 (11.046 > 2.042) and a significance value of 0.001 < α = 0.05. These findings prove the effectiveness of the developed model. The improvement in gross motor skills, including speed, agility, strength, and balance, is strongly attributed to the specific characteristics of this model.

First, the high variety of activities in each session (such as running, jumping, and throwing in different formats) prevents boredom and consistently activates various muscle groups and movement patterns, in accordance with the IAAF Kids' Athletics principle that emphasizes the introduction of multidisciplinary athletics. Second, the games used are designed with mechanics that implicitly train specific motor skills. For example, team games with obstacles not only improve agility, but also require coordination and quick decision-making in a fun context. The structure of these team-based games also utilizes children's social dynamics to increase motivation and engagement (enjoyment), which are key factors in motor learning retention.

These findings are in line with the motor development theory proposed by (Gallahue, 2012:53), which emphasizes the foundation of basic movements. However, this study expands on that understanding by showing that effectiveness lies not only in the introduction of basic movements, but in how those movements are packaged namely, through developmentally appropriate game modifications, an emphasis on active participation, and minimal rigid technical instruction. These results are consistent with research by (Ningrum, 2022), which also found a positive impact of athletic game modifications. The success of this model supports the findings of (Abhaydev, 2020) that intense engagement in activities that children enjoy facilitates better neuromuscular adaptation.

The high model validation rate (94.89%) indicates that the integration of scientific principles (IAAF), developmental appropriateness, and fun elements in activity design is an applicable and acceptable combination in the context of physical education in Indonesia. While previous studies such as (Logan et la., 2012; Barnett et al., 2021) focused on the effectiveness of general motor programs, the novelty of this model lies in its systematic and contextual composition, explicitly designing coherent athletic game scenarios to achieve specific motor goals, while addressing the needs of the curriculum and pedagogy at the Indonesian elementary school level.

Conclusion

This study concludes that a systematically developed, game-based athletic training model for children can significantly improve the motor skills of elementary school children. Through a fun and structured approach, this model has been proven effective in strengthening gross motor skills such as coordination, agility, muscle strength, and balance. The improvement in students' motor learning outcomes also shows that a basic movement-based approach packaged in the form of games provides the right stimulus for the physical development of school-age children. In addition to its statistically proven effectiveness, this model has a high level of applicability in physical education practices in elementary schools.

High expert validation reinforces that this training design is relevant to children's developmental needs and can be widely implemented. Support from various previous research results also emphasizes that the kids athletics approach contributes positively to children's physical fitness and motor skill development. Furthermore, the model developed in this study makes an important scientific contribution because it fills a gap in the literature related to the development of contextual athletic training models for elementary education in Indonesia. The integration of curriculum objectives, pedagogical strategies, and motor skill development makes this model an innovative and potentially applicable tool for effective and enjoyable physical education learning.

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I, as the lead author, representing all other authors, hereby declare that the article we have submitted is an original work that has not been published or submitted for publication in any other journal. We ensure that the entire content of the article has been compiled based on independent research and follows applicable academic guidelines. Should any elements of plagiarism or academic misconduct be found in this article at a later date, I am willing to take full responsibility and accept all consequences in accordance with the regulations of the Porkes Journal. We appreciate this opportunity and would like to thank SDN 1 Sukoharjo 2, the students who participated, the validators, and other supporting institutions that have supported this research.

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