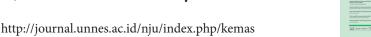


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Bola Bali Maning Games Movement Activity to Physical Fitness Improvement

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Abstract

Elementary school children experience development in all aspects, both in terms of physical, psychological, and sociological in 2022/2023. In the field of motor skills, elementary school-age children have entered basic movement patterns, and becoming skilled requires practice. They also need training for social maturity and physical fitness improvement. Games combined with the Teaching Personal and Social Responsibility (TPSR) approach can develop physical abilities, movement coordination, psychology, and social skills according to the characteristics of elementary school students. The purpose of this study was to produce a product model for learning physical fitness material for elementary school students in grades II with the TPSR approach. The research design used is Research and Development. This research was conducted in elementary schools in Semarang City, Central Java, Indonesia. The entire population was used as a research sample of 209 students. Data collection techniques using observation. The experimental data were analyzed descriptively analytically. The results showed that the physical education development model of fitness material with the TPSR approach was carried out through the Bola Bali Maning (Back Ball Match/ BBM) games. The results of small-scale and large-scale tests for assessing attitudes, knowledge, and skills in physical fitness material show that the TPSR approach has an effect on student character with a p-value for each assessment of 0.000 <0.05. It can be concluded that the development of a physical education learning model for fitness with the TPSR approach through BBM games is effective in improving students' knowledge, attitudes, and skills.

Introduction

Physical education is an integral part of education in general, physical activity is used as a means or tool for education, the physical activity carried out is selected physical activity adapted to educational goals, and the physical activity presented is arranged systematically. In addition to developing the elements of body movement, namely strength, endurance, explosiveness, agility, speed, flexibility, balance, and coordination, physical education also develops other psychological aspects, such as intelligence, religion, and social (Martínez et al., 2020). Physical education emphasizes not only psychomotor and cognitive aspects but also emphasizes affective and social aspects. Realistically, it can be understood that the overall values of physical education in student

development cannot be separated in the corridor of the three dominant behavioural domains namely cognitive, psychomotor, and affective (Escartí et al., 2018). This is in line with the views of Dahrial (2021) that physical education is a process through which physical activity is systematically designed and structured to stimulate growth and development, improve physical abilities and skills, intelligence, and form character as well as positive values and attitudes for every citizen to achieve educational goals.

The characteristics of children are an integral part of the physical education process because all the components needed in physical education must be adapted to their level of growth and development. Facts on the ground show that elementary school children experience development in all aspects, both physically, psychologically, and sociologically. In the field of motor skills, elementary schoolage children have entered basic movement patterns, and becoming skilled requires practice. They also need training for social maturity and physical fitness improvement. For elementary school-age children, the function of physical fitness is very important to provide learning tasks at school properly. In addition, physical fitness for children ensures good physical growth and development.

Research on student physical fitness conducted by experts has shown very alarming results. The results of this study illustrate that the physical fitness status of students from elementary to high school is currently low (Darmawan, 2017; Mubarok, 2021; Sulistiono, 2014). The low physical fitness status of students is caused by a lack of physical activity, both at school and outside of school. Advances in technology make students prefer to do activities using the power of two machines rather than human power. On the other hand, physical education has lost its charm so students are less enthusiastic when participating in physical education lessons.

The low status of students' physical fitness has a very broad impact, covering almost all areas of human life: social, economic, political, and cultural are affected. Students with low physical fitness status are vulnerable to degenerative diseases such as obesity (Escartí et al., 2018). If germs come to attack, health costs increase, and as a result, life becomes no longer productive. The introduction of the paper discusses the importance of being healthy and fit to achieve happiness. It highlights that physical activity, such as sports, is the most appropriate way to obtain health and fitness. The introduction emphasizes that regular, scalable, and programmable physical exercise routines can lead to physical fitness, which in turn leads to good health (Nasrulloh, 2014). One alternative that can be done by physical education teachers to overcome the problem of low physical fitness of students, especially in lower grades of elementary school is to improve the physical education learning process. These improvements can be started by applying the learning model in the game.

The game learning model can be one solution to overcome these problems. As stated by Mubita (2017) another form of Physical Education activity introduced is in the form of games. Games are activities that have a clear goal, beginning and end, rules, and feedback. A game also offers the possibility to play against an opponent (Vaghetti et al., 2018). This game model is a learning model that is much liked by children and adolescents. In short, playing games is not just a childhood joy; play plays an important role in early development and enhances cognitive and social functioning throughout the lifespan (Noda et al., 2019). The game itself teaches cognitive and social skills. For example, multiplayer games teach shared attention, turn-taking, strategy, and appropriate social behaviour in response to other players (Martínez et al., 2020).

The game method in physical education activities is combined with the Teaching Personal and Social Responsibility (TPSR) approach so that apart from being an effort to improve student's physical fitness, this approach can improve students' social skills. The development of fitness learning in the Physical Education subject has been carried out a lot and it is necessary to continue the development with other approaches, such as the TPSR approach. TPSR is a pedagogical model that can increase motivation, basic psychological needs, personal and social responsibility, school climate, and the intention to be physically active in students (García-Castejón et al., 2021). TPSR is considered an adequate pedagogical approach to promote values education through the promotion of responsibility, autonomy, and the integral development of learners in their social environment (Manzano-Sánchez et al., 2020). Its implementation in the context of education is carried out progressively through the five levels of responsibility proposed by Escartí et al. (2018): (1) Respect the rights and feelings of others, (2) participation and effort, (3) personal autonomy, (4) helping others and leadership, and (5) transfer outside the classroom; which defines the behaviours and attitudes that increase the capacities of students (Martínez et al., 2020), and thus, obtain guidelines for individual and group responsibility in line with the implicit values of society (Moston, 1966).

This is to the results of research submitted by Syafei (2021) that the application of TPSR learning to the physical education model has a significant effect on students' responsible attitudes. TPSR promotes social and personal development by shifting the focus of sports not solely to acquiring sports technical skills, but also adding an equal focus to personal development and social responsibility. Research from Rusdiyanto et al. shows that TPSR works better in improving students' psychomotor skills or skills compared to conventional models. Learning to move is a transformation from someone with no motor skills to someone with good movement abilities as a result of constant stimulus. The results of psychomotor learning are an extension of cognitive (knowledge) and emotional (behaviour-based) learning. Therefore, when instructing Pencak Silat in physical education using the TPSR paradigm, affective development must come first, followed by cognitive and psychomotor aspects (Rusdiyanto et al., 2018).

Research results from Umegaki et al. show the TPSR program encourages students to develop social skills that they can utilize outside of physical education class. By encouraging students to picture events from their daily lives that are comparable to those from physical education classes, where they are urged to act appropriately, the TPSR model appears to support the development of social skills (Umegaki et al., 2017). The difference from previous research with what will be done is that the development of fitness learning will be designed so that physical activities that are considered to increase physical fitness, as well as personal development and student responsibility, are integrated with the Bola Bali Maning (Back Ball Match/ BBM) games. Anwar et al., (2019) discuss the development and effectiveness of a modified game model for improving the physical fitness level of elementary school students. The modified game model was found to be valid and relevant to physical education review and effective in improving the physical fitness level of elementary school students. Wahyudi et al., (2018) explained in the study that a significant number of students had moderate physical fitness levels, which indicates the need for

improvement in this area.

BBM games is a sports game using a bat (Paddle Tonis) and a Tonis ball which is given an elastic rope, tied to a weight/stone. The basic motion is like playing Tonis, namely by forehand and backhand (the ball bounces, and then the reflection is hit over the net until the ball is declared dead). BBM has a philosophy of Easy, Cheap, Festive, and Healthy. In addition, BBM also has components of physical fitness values, namely: strength, explosive power, speed, endurance, accuracy, agility, flexibility, balance, coordination, and reaction.

Methods

The design used in this research is Research and Development. This study developed a Physical Education Learning Model for Physical Fitness Materials for Grade II Elementary School Students with the TPSR Approach. Furthermore, it is stated that research and development procedures consist of two main objectives, namely: (1) product development, and (2) testing the effectiveness of products in achieving goals. The procedure for developing the learning model in this study went through six main stages, namely: conducting a needs analysis, compiling the Learning Syntax with the TPSR model, planning and designing learning model products, expert validation, field trials, and product revisions. The source of the research data came from information on physical education teachers at five elementary schools in Semarang City, Central Java, Indonesia, namely SD Negeri Bendan Ngisor, SD Negeri Petompon 02, SD Negeri Pongangan, SDN Rejosari 0l and SD Sampangan 02, 3 gymnastics experts, Fitness education experts, Physical Education and Sports experts Health, and Development Research expert. While the subjects of this study were 209 grade II elementary school students, with details of 27 students for small-scale trials, and 182 students for large-scale trials.

Data were collected through observation using TPSR observation guide sheets, expert opinion assessments, and assessment of children's learning outcomes which included cognitive, affective, and psychomotor domains. The validity of the data used in this study uses source triangulation and technique

triangulation. Source triangulation means looking back or comparing the degree of trustworthiness of information data obtained through several research subjects as a source of information, while technical triangulation is a technique for testing the validity of data researchers make observations, compare them with interviews, and then compare them with documentation. Instrument testing was carried out by testing the validity of the Assessment Need questionnaire for students and teachers. From the results of the validity test of the Assessment Need questionnaire, students and teachers indicated that the statement items in the questionnaire were declared valid. Data from the trial results were analyzed descriptively, by observing an in-depth study of the information and/or feedback that could be obtained from the test subjects. This learning model product will be said to work well if it can be used as a learning model in schools and can complete learning outcomes under learning objectives.

Results and Discussion

The development of the learning model begins with Needs Analysis, Product Development, and **Expert** Validation Justification. The Needs Analysis includes the first stage of carrying out observations and the results are 1) the manners and character of grade II students need to be continuously given and fostered, including in the Physical Education, Sport and Recreation. Student manners tend to start to shift; 2) lower-grade students are easily carried away by words with adult content so they say harshly and impolitely and don't respect others. The second stage is conducting Questionnaire distribution, and the results are Grade II elementary school fitness learning methods, are not yet following BNSP guidelines. The third stage is the interview, and the results are 1) there is violent behavior in grade II students; 2) his friend's book was torn; 3) fitness learning is rarely accompanied by character education materials such as respect, responsibility, participation, independence, and caring. The fourth stage is documentation of the results of the physical education teacher assessment notes. In Product Development produced a fitness learning guidebook with the TPSR approach. At the end of the development, Expert Validation Justification was carried out and the results were very good.

The results of the conclusions of the needs analysis and justification of the expert validation above as a basis for researchers to make a design of the shape of the field and the size that is appropriate and effective according to the characteristics of the environmental conditions of the Elementary School and according to the needs of grade II students' fitness lessons. The product produced in the physical education learning development model is the Bola Bali Maning (BBM) Game. The BBM game model applies the movement of rocking the ball with a bounce height distance of 50 cm as far as 8 m, walking by moving the blocks from the left foot and right foot alternately. When the block is moved, the feet must remain hanging and not touching the ground, as well as the obstacle course by carrying the ball on the paddles as far as 2 meters, then running 2 meters, returning to the obstacle course for 2 meters and running again for 2 meters and stopping at the rest point.

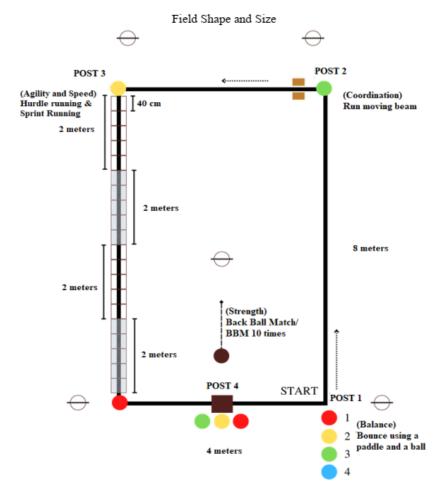
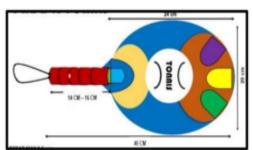


FIGURE 1. BBM Game Field. Source: Primary Data 2023



Paddles: Made of wood/multiplex

Thickness: 9-15mm

Board Length: 22-24 mm Handle Length: 14-16 mm

Board Width: 20 cm

Weight : 3-4 ounces

FIGURE 2. Paddles.

Source: Primary Data 2023

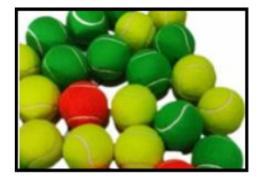


FIGURE 3. BBM Ball.

The design of this learning method opens the possibility to be modified by the teacher. Modifications must still apply the movements and rules of the game that have been determined in this game. In the learning process of sports and health physical education, the teacher may change (modify) according

to the conditions and level of difficulty of the game route and the level of students' movement abilities. The movements made are following the level of development and growth of second-grade elementary school students and following the demands of Basic Competence in the 2013 Curriculum, namely:

TABLE 1. Physical Fitness in Grade II Students at the BBM Games.

Combination type Movement	Movement Goals	Constructed Attitude
 Walk straight, keep the ball from falling Moving blocks, holding one foot while moving blocks Running straight, running fast with the ball above Jump sideways to the right and left, punching forward. This game can be varied with various movements and adapted to the basic competencies of grade 2 elementary school. 	To build students' physical fitness by influencing quality: • Movement agility. • Movement speed. • Movement endurance • Muscle strength • Flexibility of motion.	In playing involves all students to play a role according to their duties, both individually and in groups, so that it will foster the attitude of: Responsibility for self and others. Participation and self-control. Respect for others Collaborate with friends without supervision Caring/helping/sacrifice for others.

Source: data processed 2023

TABLE 2. Small-Scale Trial Results.

Evaluation	Pretest	Posttest	t	Probability	Effect	Significance
Attitude	3.022	3.941	-9.671	0.000	Have Influence	Significant
Knowledge	72.074	81.407	-4.096	0.000	Have Influence	Significant
Skills	3.052	4.052	-10.594	0.000	Have Influence	Significant

Source: data processed 2023

TABLE 3. Results of Large-Scale Trials.

Evaluation	Pretest	Posttest	t	probability	Effect	Significance
Attitude	3.049	3.986	-23.4756	0.000	Have Influence	Significant
Knowledge	71.385	80.17	-9.24895	0.000	Have Influence	Significant
Skills	2.995	4.03	-28.4037	0.000	Have Influence	Significant

Source: data processed 2023

The product design was evaluated by 3 experts with different competencies, namely 1) Dr. Tommy Soenyoto M.Pd., as a fitness expert, 2) Mrs. Dr. Rumini M.Pd., as a Sports and Health Physical Education Expert, 3). Mr. Donny Wirayudha Kusuma S.Pd., M.Pd. Ph.D. as a Development Research Expert The conclusion of the expert evaluation results states that the design of the Fitness game is very good with an average percentage of results of 86.4% (gymnastics expert), 91.4% (Physical Expert), and 77.1% (Development Expert). The average result of the assessment is 86,4% in the "Very Good" category. The experts agreed to provide suggestions and revisions to the game product design as follows: this game is good and effective for learning fitness for grade 2, it's just that the activities must be added (modified) so that it can provide more experience for students in exploring the characters taught by the teacher.

Based on the evaluation of the experts in Physical Education, Sport, and Health, it was stated that the design of the Grade II fitness game model needed additional activities for small-scale tests. Physical Fitness Learning Syntax in Grade II with TPSR Approach through BBM games: a) Opening the lesson with greetings; b) Absence of student attendance; c) Explain the importance of exercise to maintain health, and body fitness and train a sporty spirit; d) Affirms that in sports, the best achievements are responsibility, discipline, respect; e) Give an

explanation of the game rules; f) The formation of playgroups consists of 4 players; g) Starting from post 1 to post 2 by rocking the ball with a bounce height of 50 cm as far as 8 meters; h) From post 2 to post 3 with walking movements by moving blocks from the left foot and right foot alternately. When the block is moved, the feet must remain suspended and may not touch the ground; i) From post 3 of the obstacle course carry the ball on the paddles as far as 2 meters, then run 2 meters, return to the obstacle course as far as 2 and run again for 2 meters and stop at the rest point; j) The player goes straight to post 4 to hit the ball back and forth. The player punches forward with a 4-meter bounce. Based on the results of the small-scale test analysis, it was concluded that the TPSR approach through BBM games development was able to improve attitudes, knowledge, and skills in grade II elementary school students. The average value of the small-scale test results is presented in Table 3.

Based on the results of the small-scale test above, it is known that there has been an increase in the assessment of attitudes, knowledge, and skills. According to the test results, it can be stated that learning development products with the TPSR approach through BBM games can be used to improve the character knowledge, attitudes, and skills of grade II students. Based on the results of the large-scale test analysis, it was concluded that the TPSR approach through BBM games development was able to improve attitudes, knowledge, and skills in grade II elementary school students. The average value of large-scale test results is presented in Table 4.

Based on the results of the small-scale test above, it is known that there has been an increase in the assessment of knowledge, attitudes, and skills. According to the test results, it can be stated that learning development products with the TPSR approach through BBM games are appropriate to be used to improve the knowledge, attitudes, and skills of grade II students. In the table above, the results of small-scale and large-scale tests for assessing attitudes, knowledge, and skills in physical fitness material all show influence and significance. This shows that the application of TPSR through BBM games in fitness learning can change the character as well as the

knowledge and skills of students, it happens. This is in line with or strengthens the results of research that has been done by Dupri (2019) which states that the TPSR model is better than the cooperative learning model in developing students' tolerance for physical education learning. This is confirmed by Supriyatni (2019) that learning physical education through the application of the TPSR model or another term called Hellison influences the responsible attitude of students at Yadika Cicalengka ICT Vocational School. The influence of Physical Education learning through the application of the Hellison model on students' responsible attitudes at Yadika Cicalengka ICT Vocational School has a significance value of 0.000 < 0.05.

Research result from Setiawan, Jumareng, Aryani, & Kastrena (2021) shows that the TPSR learning model intervention has the potential to improve the attitude of responsibility or the character of students. Through TPSR, male students who previously had the character of not caring about the theme did not have respect for teachers or friends, did not have moral knowing and moral action gradually experienced real changes, such as male students had an attitude of respect shown by behaviour willing to admit defeat, willing to help his friends when studying, willing to listen to lecturers' explanations, not joking while studying. This is also in line with the results of the study by Yuwono, Rahayu, Sulaiman, & Rustiadi, (2020) which states that the feasibility test data, TPSR can stimulate student character to be better. TPSR is proven to increase the percentage of better characters, although not fixed, but affects changing students' attitudes. Research results from Juliantine & Ramadhani (2018) show that there is a significant influence of the application of the TPSR learning model on students' social responsibilities and behaviour. There was an increase in the pretest and posttest average scores in the TPSR model for both responsibility (p-value = 0.00) and social behaviour (p-value = 0.00). Thus, it can be concluded that the application of the TPSR learning model is very important in increasing the attitude of responsibility and social behaviour of students.

The findings of this study are also in line with the results of research from Rusdiyanto,

Mulyana, & Mulyana (2018) which state that TPSR has a knowledge or cognitive impact because in learning Pencak Silat cognitive skills are needed, especially in solving problems as one of the elements in Pencak Silat and in learning tactics which can influence students' cognitive aspects. Pencak Silat requires students to perform many movement skills. Several movement skills must be learned and require thinking skills. This shows that there is a relationship between cognitive skills in learning Pencak Silat. When facing problems in learning Pencak Silat, it will only be solved by following a cognitive process. In Pencak Silat, students will be familiar with movement patterns that must be understood and mastered so that they can perform effective, efficient, and productive Silat movements.

Research from Rusdiyanto, Mulyana, & Mulyana (2018) shows that TPSR works better in improving students' psychomotor skills or skills compared to the conventional model. Learning to move is a change from a student who cannot do anything to someone who has good movement skills caused by continuous stimulation. Psychomotor learning outcomes are a continuation of cognitive (understanding) and affective (shown in behaviour) learning. Therefore, affective development be prioritized followed by cognitive and psychomotor aspects when training Pencak Silat in physical education learning through the TPSR model. Research results from Umegaki et al. (2017) demonstrated the TPSR model promotes the acquisition of social skills that students can use outside of physical education classes. The TPSR model appears to promote the acquisition of social skills by encouraging students to imagine scenes in their daily lives that are similar to scenarios in physical education classes, in which they are encouraged to behave responsibly.

The results of this study also support Adi, Soenyoto, & Sulaiman, (2018) who states that there are seven aspects of an effective teaching and learning process, namely teacher-student interaction centered on students, democratic situations, variations in teaching models, useful and acceptable materials, conducive environment and good facilitation. Through this theory, it is known that the ideal teaching

and learning process shows the relationship between teaching and development. The role of applying TPSR through BBM games in fitness learning can change students' character as well as knowledge and skills. This change is due to the relevance between games used as media and fitness as the subject matter, there is an element of joy. Games are part of the lower class way of looking for fun, while fitness is an activity that can be done jokingly. Fun in games and fitness activities makes it easier for teachers to give messages of norms so that a sense of responsibility for self and others grows, participation and self-control, respect for others, working together with friends without supervision, and caring/helping/sacrificing for others. This is as stated by Escartí, Llopis-Goig, & Wright (2018) and Santos, Miguel, Wright, Sá, & Saraiva (2020) that TPSR can provide an effective framework for promoting responsibility across the school curriculum.

The role of implementing TPSR through BBM games in fitness learning can change students' character as well as knowledge and skills in line with research findings from Caballero-Blanco, Delgado-Noguera, Escartí-Carbonell (2013) that the TPSR model has contributed to the positive development of children and youth (improved responsible behaviour, social skills, classroom environment, etc.). Implementation of the TPSR approach through BBM games besides functioning for the advancement of the soul also affects the emergence of sharpness of mind, the subtlety of taste, and strength of will. The influences that exist in children's games, for example, additional awareness of inner and outer strength and the habit of adapting to each new situation every time, more firmly correcting all mistakes or deficiencies in oneself. In other words, children practice mastering themselves, as well as being aware of the strengths of others and adopting the right and wise strategy or attitude, namely a practical-idealist strategy. Children's games are very useful for educating self and social feelings, discipline, order, and getting used to being alert and alert, and ready to face all circumstances and events. Children's games get used to thinking real and eliminate feelings of shyness or easily giving up. Children's games educate children to continue to be able to fight until the goal is achieved.

The education contained in children's games is received by children not by coercion or orders but because of the will and pleasure of the children themselves to receive and experience all these very pedagogical influences. This means that children's play is also very important to strengthen their sense of independence. If a child is invited to play by a friend, of course, he feels happy because he has the opportunity to take part in the game. In playing, children certainly feel pleasure. As mentioned above, one of the requirements for children's play is that it must be fun. And the joy that exists in this child creates a phase of a good opportunity to progress. Someone who has the opportunity to take part in a game, of course, feels free from all pressures so that the feeling of joy and happiness that he has. In this atmosphere, usually, children easily accept the new things they want. So this good opportunity must be filled with a game that is quite directional and contains noble educational elements. This educational element will certainly easily enter the child's personality.

Playing together with peers is a blessing for a child. Because not infrequently children do not have the opportunity to play with their friends. The opportunity to meet is very profitable because by making friends, children can get to know other people's personalities it is quite valuable in the future when living in a society with different individuals. In playing, all members have the same position, whether they are children of rich people, children of high officials, or children of labourers, they are all the same. Social status has absolutely no effect on the game because their position in the game is the same, namely as game participants. In games, there are always rules. The rules of this game are always based on the existing general rules, which are always agreed upon by the participants before the game starts. Thus, each participant feels that he has contributed to the game. So it is appropriate that they are also responsible for complying with the rules of the game because they agreed to them.

If some don't comply, their friends will make fun of them, so in the end they feel ashamed if they can't comply with the rules they have made. Thus, in playing children also get an educational element, namely shame if they cannot comply with the rules. As is known, most of the characteristics of children that are often encountered are whiny or crying easily. Through Mini Tonis Games with the TPSR approach, children can be trained not to be a crybaby. In games that require children to run, chase, and so on, children can fall. If this happens while playing, and when many other friends are also playing, then the child can't cry. Research from Carreres-Ponsoda, et al. shows that TPSR not only increases personal and social responsibility but also pro-social behaviour (Carreres-Ponsoda et al., 2021). Research from Escarti, et al. emphasized that the TPSR approach helps teachers to structure classes and promote responsible student behaviour learning (Escarti et al., 2011). Significant improvements in self-regulation and self-efficacy were also observed in the intervention group participants.

The TPSR model is a model for changing a less responsible lifestyle into a more responsible lifestyle, for example by doing the TPSR model students are more responsible in carrying out the tasks assigned by the teacher (Patah, Ihsan, Ma'mun, & Mulyana, 2020). TPSR is suitable for teachers and can be used with all students in the curriculum. The program can be utilized for any teacher or course, regardless of these factors, and it does not have more appropriate material or target audiences than other applications. It is considered appropriate to increase educational values without destroying content, showing more simplicity for teaching new content and motivating teachers (Manzano-Sánchez et al., 2020). Based on the process and results of the development of the physical education learning model, this model provides theoretical and empirical beliefs to be implemented in schools to improve the physical fitness of students at school. The learning model with the TPSR approach through BBM games can be used as a physical education learning model and can improve students' physical fitness.

Conclusion

The development of sports and health physical education learning models with the TPSR approach is carried out through Bola Bali Maning (Back Ball Match/ BBM) games

products. The results of small-scale trials and large-scale trials showed an effective increase in fitness in second-grade students in the domains of knowledge, attitudes, and skills. Based on the conclusions above, several suggestions can be put forward. Teachers should always be sensitive to the learning process so they can find deficiencies or weaknesses and then develop learning models. Students should make the learning process an interesting activity so that in the learning process there is a high enthusiasm for participating in learning activities. Schools should pay attention to the learning process, and if possible give appreciation to teachers or students who contribute to each development of learning models.

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