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Development of soft takraw balls for children

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Abstract: Recognizing and developing the game of sepak takraw at school basic then need to make development according to the level of growth and development of children. This study aims to develop suitable and user-friendly soft takraw balls for children. This research and development adopt the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) which focuses on developing sepak takraw for children's sports by paying attention to three aspects of quality; namely effective, practical, and valid. The takraw balls that were created have been validated by sports experts such as physical education teachers, sepak takraw practitioners, and also by respondents. The results of validation data by experts, a total score of 90% (r=.9) showed high validity. Validation data by media experts and user respondents obtained 100% (r= 1.0) which is also high validity. It can be concluded that the newly created soft takraw balls for children are suitable for the game nature and user-friendly. The quality of the ball will reduce the cost and increase the usage among young players due to the practicality.

Keywords: development, takraw ball, children.

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INTRODUCTION

Research on curriculum teaching reform in general vocational colleges has changed from the traditional focus on technology, and teaching methods and means (Hao et al., 2022). For example, some scholars have conducted research on professional teaching reform in universities; some scholars have researched the development of fitness value and other related aspects from their point of view (Zheng et al., 2021), (Herman et al., 2021), (Alfiansyah et al., 2021). For children's sports equipment, we cannot equate it with standard sports equipment in general. It may cause discomfort and risk of injury (Islam, 2019); (Santiago-Lugo & Hopple, 2019).

It is essential to export qualified preschool teachers, cultivate talents in line with social development, and improve the quality of preschool education. (Yuniastuti & Hasibuan, 2019). Through development, the varied contexts of children's movements provide different opportunities or affordability for actions that are fundamental to promoting their skills and competency. As children get older, the school environment and sports become important. Child development occurs in a socioecological context starting from proximal to distal, through a process of reciprocal interaction that develops between children and the multidimensional level of the environment, such as physical, material, social, emotional, symbolic, and cultural. (Flôres et al., 2019). The existence of certain motor skills opportunities for learners in certain contexts does not mean that learners can automatically feel and act on them, but some environments can provide better affordability than others and thus have greater potential and talent to encourage the development of a child. Products in direct settings in the home, school, and sports environment must represent the most encouraging ecological fit in terms of learners' motor development. Scholars also allude to the affordability of environmental calls for movement and physical activity as some are more inviting than others to increase physical activity, sedentary, and healthy behavior (Withagen & Caljouw, 2016).

The sport of sepak takraw can be good to develop and teach at the basic education level. The conventional learning system for sepak takraw is still the basic practice principle for dates, namely

learning individually, autonomously, paired, wall and rope. Therefore, it is necessary to develop a new concept of learning basic sepak takraw techniques outside of conventional concepts. Modification is a form of sport development that is adapted to the specific needs and abilities of a group of people.

The sepak takraw game is not yet included in the curriculum but is still included in the scope of physical education, including small ball games (Atmaja & Anggorowati, 2019). The game of sepak takraw is very good to be taught and developed at the elementary school level. Sepak takraw is very good at learning at school, namely increasing the growth and development of students both physically and psychologically (Artyhadewa, 2017). The sepak takraw game material that is taught is not difficult and burdensome for children, because elementary school-age children are still at the childhood stage to play. Through play, what children feel is fun and joy without thinking about the final result. By playing, children will indirectly recognize the characteristics of the game being taught and can interact well with their playmates. This interaction will motivate the child to move actively so that the psychomotor, affective, and cognitive aspects of the child also develop. The skillful movement shows the nature of efficiency in its implementation. The movements carried out are psychomotor activities, psychomotor activities are mainly oriented to the movements performed and emphasize the physical responses that can be seen or the forms of movements carried out by the body, especially movement balance exercises that can improve mastery of technical skills in one sport.

Learning sepak takraw at the elementary school level can be used as an investment in children's movement which includes the development of children's growth physically, mentally, and socially (Lumintuarso, 2013). The sport of sepak takraw provided is expected to able to develop basic movement skills in playing sepak takraw, develop children's physical fitness and develop children's social mentality. It was found that the game of sepak takraw was not often taught by educators to students. The results of observations and interviews of researchers with physical education teachers in the city of Medan, revealed that there were four problems regarding the learning of sepak takraw in upper-grade elementary schools as follows: First, physical education educators are more likely to learn rounders and badminton games. Rounders and badminton games are learning small ball games that are easy to give to students. Second, physical education teachers still have the notion about sepak takraw which is not easy learning. Physical education teachers think that using a hard takraw ball is not easy for students learning process. From this opinion, it can be concluded that physical education teachers are not able to play sepak takraw because of their limited abilities and the tools used do not make children safe.

Sports extracurricular activities are one of the activities carried out in the context of fostering students. The rules and legal basis regarding sports extracurricular activities refer to the Regulation of the Minister of National Education of the Republic of Indonesia Number 39 of 2008 concerning Student Development. In Article 1 of the Law, it is stated that the objectives of student development, in this case, related to sports extracurricular activities, are: (1) Develop students' abilities optimally and in an integrated manner which includes creativity, interests, and talents; (2) strengthening the personality of students in creating a school environment as an educational environment, the hope is to avoid all efforts and impacts in a negative direction that is contrary to the purpose of education; (3) Actualizing the ability of students to achieve excellent performance, the expectations are following what their talents and interests are; and (4) Prepare students to become citizens of society who have a noble character, are democratic, respect human rights in the context of realizing a very good society.

Based on the results of observations on October, 2021, researchers found that 1) the lack of introduction to the sport of sepak takraw to children, 2) the lack of popularity of the game of sepak takraw around the school environment and when compared to sports in other fields, for example, soccer and volleyball, 3) there is still a lack of interest in the sport of sepak takraw, 4) the level of agility of students participating in the training has not yet been identified, 5) the level of skill in performing the basics of the game of sepak takraw has not yet been identified 6) limited sports equipment in the school environment, especially in the sport of sepak takraw.

Elementary school education level children are generally at the age of 7-11 years. This age is in the stage of concrete operational thinking. Children at this stage can solve concrete problems. The concrete operational stage is the transition stage from the pre-operational stage to the formal operational stage. The way children think at this stage relates to something concrete and abstract problems cannot be resolved.

There is a theory that also explains the physical development characteristics of elementary school-aged children (8-12 years). This age is a period of rapid development for children. Bone parts increase in length and expand rapidly. Children's height increases between 5 and 7.5 cm every year. Previous research facts prove that the use of the modified soccer learning model in the learning process can improve the results of Silat learning in the takraw game material. There is a significant difference in the application of the modified sepak takraw game on students' learning motivation (Soetacik, 2019); (Umam & Hartati, 2014); (Muhammad Asrul Sani, 2020). The findings of this study found that the large group trial had found very good results so no product revision was carried out. The average percentage value of the questionnaire in the large group trial was 100%. This shows that the basic technique of Silat training for athletes at an early age by researchers is in the very good category (Syam, 2022).

To introduce sepak takraw through learning to elementary school level children, it is necessary to develop games or tools used according to the student's ability. The essence of developing a new Sepak takraw ball is to make it easier for students to play takraw without feeling bored, and tired. This research focuses on the development of special takraw ball, it is hoped that it will provide opportunities that are not different for all children. Based on the description above, it is necessary to develop a soft takraw ball for children's sports. This research is expected to contribute, especially for teachers of elementary school students to the development of soft takraw balls for children's sports.

METHODS

This research is development research using the ADDIE model development method which aims to develop a soft takraw ball for children by paying attention to three quality aspects: valid, practical, and effective (Nada Aldoobie, 2015). The ADDIE model which consists of 5 stages is a related and structured system that is used sequentially.

Stage of Analysis

At this stage, the need for soft Takraw ball Development and analysis is feasible as a new tool. Researchers by observing 1) the lack of introduction to the sport of sepak takraw to children, 2) the lack of popularity of the game sepak takraw around the school environment and when compared to sports in other fields, for example, football and volleyball, 3) still lacking interest in the sport of sepak takraw, 4) the level of agility of students participating in the training has not been identified, 5) the level of skill in performing the basics of the game of sepak takraw has not yet been established 6) the limited sports equipment in the school environment, especially in the sport of sepak takraw. Based on the data the researchers designed the development of the new takraw ball.

Design Phase

Develop a ball-making plan that begins with compiling a framework for developing takraw balls. The reference in the preparation of takraw ball development is the product specifications that have been made. The second step is compiling the framework for developing takraw balls, after that the researcher collects the required materials for a new ball with a weight: of 120 grams, and a circumference: of 42 cm.

Development Phase

The product design has been compiled, then developed as follows: (a) compiling the development tools that have been collected and validated (b) Making product validity questionnaires for experts, and student responses. The expert's product validity questionnaire consists of aspects of material, size, color, and design. The student response questionnaire consists of the operation or use of media, reactions to using, and supporting or additional facilities. (c) Design validation of takraw ball development carried out by media experts. The purpose of validation is to get assessments and suggestions from media experts for developing takraw balls. (d) After receiving input from experts and being validated, the weaknesses are identified. These weaknesses are then tried to be reduced by improving the products developed. Products that have been revised and get a good predicate, then the product is continued to the next stage for implementation.

Implementation Phase

The implementation phase is carried out on extracurricular students at Elementary School 107399 Bandar Khalipah. During the trial, the researcher made notes about the shortcomings and

obstacles that still occurred when the product was implemented, besides that students were also given a response through a questionnaire regarding the use of soft takraw ball.

Stage of Evaluation

Evaluation is a series of processes to analyze products in the implementation flow, there are still product deficiencies and weaknesses. If there are no weaknesses based on experts, then the media is feasible to use. Data collection techniques in the development that have been compiled in this research: (a) Interview techniques are used to find out specific things that require in-depth answers from the physical education teachers, Elementary School 107399 Bandar Khalipah. (b) Questionnaire is used to determine the validity and practicality of the developed product. The questionnaire used is a validated questionnaire and a questionnaire to find out how the response is. The validated questionnaire was used to assess the validity of the expert team regarding the soft Takraw ball that had been created by referring to Table 1 and Table 2.

The data analysis technique of this research is qualitative and quantitative: (a) Quantitative data analysis was made to analyze the data collected from the questionnaire data. The results were obtained at the design validation research stage and usage trials. The scores obtained at each stage were obtained by using a validity analysis. 45 teachers and the student responded to the development of takraw balls. (b) Qualitative descriptive analysis was made to process interview scores, and data from a questionnaire of criticisms and suggestions by learning media experts, learning experts, and material experts. Data analysis techniques were used to classify information from qualitative data in the form of responses, suggestions, and criticisms for improvements and product revisions for developing takraw balls.

Table 1. Expert Assessment Criteria

Score	Indicator
0% - 20%	Very inappropriate
21% - 40%	Not feasible
41% - 60%	Decent enough
61% - 80%	Worthy
81% - 100%	Very Worthy

Table 2. Student Questionnaire Assessment

Score	Indicator
0% - 20%	Very Not Good
21% - 40%	Not good
41% - 60%	Quite good
61% - 80%	Well
81% - 100%	Very well

RESULTS AND DISCUSSION

This study focuses on developing takraw balls made of soft materials for children's sports by paying attention to three aspects of quality, namely effective, practical and high validity.

Figure 1. Developed Takraw Ball

The specifications for developing the takraw ball are weight: 120 grams, circumference: 42 cm, and made of plastic. The takraw balls that produced have been validated by media experts, sports practitioners,physical education teachers, and student respondents. Based on the results of media expert validation, it can be described in Table 3.

Table 3. Media Expert Validation Results

No	Aspect/ Criteria	Score	Value (%)	Category
1	Product Usage	4	80%	Valid
2	Product Effectiveness	5	100%	Very Valid
	Total	9	90%	Very Valid

Based on Table 3, a total score of 9 was obtained with a percentage of 90% (r=.9) which was included in the "Highly Valid" criteria. The takraw ball was feasible to be used in research. In addition, all experts also added comments and suggestions, such as the ball made quite interesting and appropriate for the size of elementary school children who are new to sepak takraw.

Table 4. Expert Validation Results of Sepak Takraw Practitioners

No	Aspect/ Criteria	Score	Value (%)	Category
1	Product Usage	5	100%	Very Valid
2	Product Effectiveness	5	100%	Very Valid
Total		10	100%	Very Valid

Based on Table 4, a total score of 10 was obtained with a percentage of 100% (r=1.0) which was included in the "Very Valid" criteria. The takraw ball development was feasible to be used in research. Expert from sepak takraw practitioners also added comments and suggestions, that plastic-shaped balls can be substituted with soft or rubber base materials.

Table 5. Results of User Responses or Respondents to the Development of Takraw Ball

No	Aspect/ Criteria	Value (%)	Category
1	Convenience of Use	100%	Very high
2	Ease of Use	100%	Very high
Total		100%	

Based on Table 5, the development of takraw balls is obtained with a percentage of 100% which is included in the "Very High" criteria so that the development of takraw balls is feasible to use. Raising a healthy, strong, and cheerful child is not only the task of parents but also in every preschool institution, because children spend most of their time there. In kindergarten, physical education classes are provided, which should be built following the psychological characteristics of a certain age, and the availability and suitability of exercises (Gimazutdinov, 2020). The training complex must be exciting, and must also provide a physiologically and pedagogically justified load that meets the needs of children's movement. Well-organized physical education contributes to the formation of a good physique, prevention of diseases, and increased activity of the child's internal organs and body systems. Sport has become a necessity for humans, no wonder we often see, both morning, afternoon, evening and night many people do sports activities, both teenagers, adults and the elderly.

Teachers or trainers as organizers as well as the main motivator in the development of student talent have a very important role in destination hall. In addition, the quality of the teacher or trainer is very influential on the quality of students. The exercise is programmed that contains a clear goal, the material is following the characteristics of the sports that are fostered and the time available is arranged in a precise and clear manner, and alternative training strategies are following the form of activities and materials given (Yulianto et al., 2021). The essence of football development takraw is to make it easier for children to master basic techniques and gain successful experiences without feeling bored, bored, and tired complaints of tiredness while playing the game. Game modifications are expected to provide equal opportunities for all children, so the game is not only monopolized by more capable children. Based on the description above, it is necessary to develop a model for the game of sepak takraw as learning physical education for elementary school children high class

Based on the results of media experts and expert sepak takraw practitioners that the development of this takraw is very valid in terms of product convenience and product effectiveness (Mariadi et al., 2021); (Marpaung et al., 2022). Meanwhile, based on the results of responses from takraw ball users who developed very high results in developing takraw balls. Based on research to determine the physical activity of sports for the growth and development of elementary school students (Bettany-Saltikov et al., 2019). This is because the age of elementary school children is a continuation after the golden age (Burhaein, 2017). So that appropriate learning media is needed for students. Elementary school-age children who like to play, move, group, and practice hands-on based on their characteristics (Ratcliffe et al., 2011). Therefore, related to these activities, it is adjusted to the physical growth and emotional development of children (Kilgour et al., 2015), (Ishak et al., 2021).

The physical and social environment can influence physical activity. It is very important to take into account the characteristics in developing a physical activity intervention which in this case aims to inform physical activity among overweight adolescents. (Danis et al., 2014); (Adnan et al., 2020). Apart from equipment, the model for introducing basic sepak takraw techniques is through a playful approach, which contains 5 game models based on basic sepak takraw techniques and is compiled in the form of a game guidebook. From the results of the assessment of material experts and practitioners, it can be concluded that the model of introducing basic sepak takraw techniques through a play approach for elementary school children is categorized as good and effective, so the game model is feasible to use (Kurniawan & Firdaus, 2020); (Artyhadewa, 2017). Research that the value of increasing the ability of students in playing sepak takraw in class given control and experimental class treatment with a tactical approach shows that there is a significant difference between the two. This indicates that the tactical approach affects improving the results of playing football takraw in elementary school (Erland et al., 2018).

CONCLUSIONS

Based on the results of the research obtained and the discussion, the following conclusions can be drawn: (1) The developed sepak takraw ball is declared valid and suitable for use with the validation results very valid by media experts and sepak takraw practitioners. (2) Respondents gave a positive response to sepak takraw softballs such as comfort, safety, and ease of use for young players. The new soft takraw ball specifications are weight: 120 grams, circumference: 42 cm, and made of plastic. The implication of the new ball in the sepak takraw game can foster a child's willingness to participate in the game of sepak takraw, so that the child does not feel pain anymore when the ball hits their body.

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