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Development of Boccia Balls in Children with Special Needs and Physically Impaired

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Abstract

The purpose of this study was to determine the results of the development of boccia balls to find valid and effective children with special needs disabilities at SLB-D.D1 YPAC Palembang City. The study is a research and development (R&D) research and development with the stages of borg & gall. The subjects of the study were students of SLB D.D1 YPAC Palembang City, 10 people on a small scale and 20 people on a large scale. Data were collected through questionnaires and skills tests. Data analysis used percentage analysis and paired sample t-test. The results of the final product of this study are in the form of boccia ball media which are intended for training children with special needs at SLB D.D1 YPAC Palembang City in practicing and playing boccia games. The development product has a very feasible meaning through the validation value of the media expert, which is 100% and the game expert, which is 91.67% very valid with an average validation value of 95.8% very valid. The effectiveness test explains that the developed boccia ball has an effect on improving the boccia game skills of special needs children at SLB D.D1 YPAC Palembang City, which is marked by a change in skills of 24.2 from the previous 17.1 in the early test and 25.4 from the previous 16.8 in the field test. The usefulness of this product is able to improve the achievements of boccia athletes in Palembang City. Helping coaches overcome the shortcomings of the training facilities aspect, namely the very minimal ball equipment and helping to accelerate the development of Boccia sports achievements in Palembang. The novelty of this research is developing media and facilities for matches and training in the form of balls, meeting the expected achievement of match results, getting used to adapting to balls that have standard weight and meeting the lack of ball media for training.

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INTRODUCTION

Sport is a means for humans to realize fitness and other values contained in it. (Aryanti et al., 2023) exercise can maintain and improve fitness. Explained that physical education learning must be implemented creatively. Coaches and educators must also have learning methodsor strategies in their delivery so that students can perform basic techniques wel (Ramadhan et al., 2024). (Hikmawati et al., 2023) exercise seeks to work actively to maintain and strengthen the body's muscle groups. (Setiawan et al., 2025) sports and humans cannot be separated as one unit. (Sarbani & Kumbara, 2024) sport is very influential in human life. Syamsuryadin (Kumbara & Alfatih, 2024) sports provides physical fitness, physical fitness for athletes can maintain the hope of competing. Sport is a form of physical activity that is used to maintain human health (Aryanti & Richard Victorian, 2020). Physical fitness is closely related to the quality of human resources in facing life's challenges (Hartati et al., 2020). Sport is the main capital for health and achievement, Caillaud (Rusdin & Asrin, 2024). Exercise is a movement that can increase muscle development, Vara (Oleo et al., 2024).

Sport is a right for every human being, including children with special needs. Susan d & Rizzo (Dr. Suharsiwi, 2017) characteristics of ABK are deviations from physical, mental and emotional aspects. (Irdawarni & Rahmawati, 2015) ABK children are not sick children but have special features. (Anggriyani et al., 2023) ABK conditions can occur before or after birth. (Pratiwi & Hartosujono, 2017) crew members experienced movement disorders during their activities. Children with special needs and normal children actually have a slightly different approach, where children with special needs emphasize sports specifically according to the child's character. One example of a sports game specifically for children with special needs is the game of boccia.

The boccia ball game is a sport that is competed for children with special needs. The game of boccia is a game that has been played for more than 7000 years. The game of boccea is popular because it is an international sport in competition and recreation which is intended for all people, genders, all ages, including children with special needs, (Puspitaningsari et al., 2022). Boccia ball is a competitive game, where this game can be played one on one, in pairs or in a team consisting of three players, (Gandes Luwes, 2020). The boccia ball game in a game situation aims to get a big ball after a player throws the ball and the supervising teacher determines the score by measuring the closeness of the ball to the target (Taufan, 2021).

Boccia ball is still very foreign to the ears of some Indonesians, but for children with special needs, boccia ball is the right sports facility or media to channel talent and bring out achievements, considering that the boccia ball game is one of the Paralympic events. Meanwhile in Indonesia, this sport was only introduced in 2017 at the national Paralympics in Solo which was attended by 15 provinces in Indonesia. At the 2018 Asian Para Games held in Jakarta, this sport was one of the sports contested.

Boccia sport really helps individual development, especially for people with cerebral palsy. Within limitations, children with cerebral palsy can actualize their talents and potential into competitive achievement values. (Sulistyawati & Mansur, 2019) cerebral palsy is a type of sufferer with impaired brain function. (Patel et al., 2020)

Cerebral palsy is basically a type of neuromotor disorder that causes dysfunction of movement, muscle tone and posture. (Sopandi & Nesi, 2021) Cerebral palsy sufferers more often occur due to disruption of the birth process, where the process of forming the central nerves is characterized by paralysis, paresis which causes coordination and motor function.

South Sumatra, especially Palembang City, children with cerebral palsy are children who are active in playing boccia ball. Play both non-competitively and competitively. Meanwhile, children who are involved in competitive activities in developing boccia ball sports achievements are at one of the SLB-D.D1 YPAC Palembang schools. In order to help implement achievement development training in schools, one effort that can be made is to increase the number of ball media for children's training needs.

Based on researchers' observations through preliminary studies, children really need the availability of balls so that during practice they can quickly reach a degree of automatization in mastering game techniques. The results of the initial questionnaire study distributed on the need for balls in children's training at SLB-D.D1 YPAC Palembang, more than 90% really need a lot of balls to support training performance. Training without the support of ball availability is very ineffective, making it difficult to develop high quality techniques and achieve good match performance. It is very difficult for trainers to determine variations in training so that apart from being ineffective, the targets in training do not match the targets set.

The conditions that occur on the children's field are very difficult for balls because there are limited numbers. Boccia balls are supplied with original balls which must be purchased through the goods import process. Considering that Indonesia has not produced this ball specifically. In training conditions, sometimes even for long periods of time, the limited number of balls does not make training effective enough because they have to try alternately so that it is very difficult for athletes to achieve the automatization process in the expected technique. However, the importance of having a large number of balls allows for a large number of repetitions of the frequency of movements, so that it is very possible for athletes to achieve maximum technical abilities. Considering that more than 70% of coaches need training aids, especially balls, (N. M. Sari et al., 2022). In the conditions above, one way for children to practice effectively even if they are not supported by real bocce balls, is the need to develop ball media to help the smoothness and effectiveness of training with lots of balls available. Training is a development program for athletes to achieve competition (O. N. K. Sari et al., 2019). The development of tools designed for training can certainly provide convenience and efficiency for coaches and athletes in training (Iyakrus et al., 2023). This statement supports that good preparation in training is an asset for athletes and coaches in developing training performance. The importance of a large number of ball facilities or media really supports the quality of training in order to achieve competitive goals in the boccia sport for children with special needs in the YPAC environment in Palembang City.

METHODS

This research is research and development (R&D) research and development by adopting the borg & gall

stages which consist of the ten research stages below:

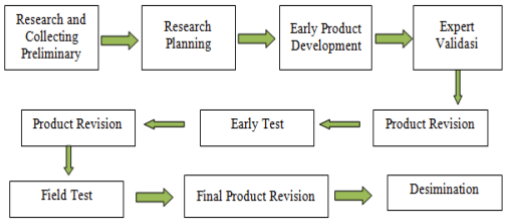

FIGURE 1. RESEARCH DESIGN FOR THE ADOPTION OF BORG AND GALL MODELS

Data on research and information collecting activities was collected through observation documents and interviews. At the planning stage the researcher analyzes what the research subject needs. The development stage then designed a development product in the form of a modified boccia ball. Validation involves several experts related to product requirements, namely game experts and media experts. The initial test used 10 students and the field test used 20 students from SLB D.D1 YPAC Palembang. Product revision is a step to improve the product based on considering suggestions from expert validators and revisions from the results of early field trials and field tests. Data was collected through questionnaires for expert validation and to test the effectiveness of a skill test in placing the ball on the target. The steps for carrying out the test are that the athlete stands in front of the starting line in the area, the athlete is given the opportunity to throw 10 throws, the athlete throws the ball towards the colored target provided on the field. The score recorded is the ball that successfully enters the circle where the green score is the score with 4 points, the yellow score is the score with 3 points, the red score is the score with 2 points, the blue score is the score with 1 point, if the ball is in position of the line between the score colors with the largest value recorded. The final score is the score with the total of 10 points thrown.

Data analysis for validation was carried out using a temporary percentage analysis of product effectiveness with a one group pretest-posttest experimental design through statistical analysis using the paired sample t test.

RESULT

Expert Validation

Table 1. Average Expert Validation Score

Validator	Percentage	Description
Media Expert	100	Very Valid
Game Expert	91,67	Very Valid
Mean	95.8	Very Valid

(Source: Researcher Document, 2024)

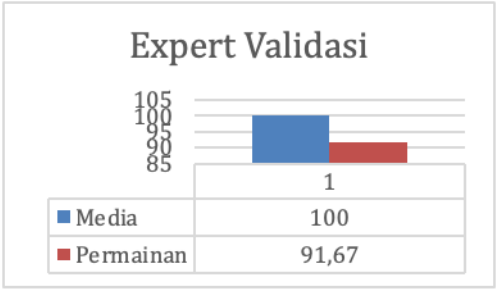

Figure 4.1 Mean Validation
(Source: Researcher Document, 2024)

Based on the table and graph above, it is explained that media expert validation gives a score of 100% with the meaning of very valid, game expert validation gives a score of 91.7% with the meaning of very valid and the average validation value of boccia ball development products for children with special needs, the type of disability. daksa at SLB D YPAC Palembang is 95.8% with very valid meaning.

Product Revision

The questionnaire filled out by media experts has a percentage value of 100% which means it is very valid. This shows that the value given by media experts is perfect. However, notes conveyed orally by media experts stated that the boccia ball development results could be revised with more detailed

adjustments based on the results of the effectiveness test if the results of the effectiveness test showed that there was no improvement in playing skills. On the other hand, the results of the effectiveness test showed that there was a significant increase in students' boccia playing skills. This indicates that there is no revision from media experts.

The questionnaire filled out by media experts has a percentage value of 91.67%, which means it is very valid. However, considering the advice given by game experts from the twelve statements regarding boccia ball development products, there is one statement that needs to be paid attention to, namely statement number three which states that the circle of the ball adapts to the condition of the ball used for the match. The condition of the ball circle before validation and after revision is as follows:

Table 2. Game Expert Product Revisions

No	Before Revision	After Revision	Information
1	Circles with a diameter smaller than 270mm	Adapted to the diameter of a boccia match ball, namely 270mm	Fixed

(Source: Researcher Document, 2024)

Based on the table above, it is explained that the diameter of the boccia ball circle has been corrected, where before the revision the ball was designed to have a diameter below 270 mm, then revisions were made to adjust it to a diameter of 270 mm.

Early Test

The initial field trial involved 10 SLB D.D1 YPAC students in Palembang City. The results of the effectiveness test can be seen in the table below:

Table 3. Efektivitas Early Test

Test	Mean	Tcount	Ttable	Information
Pretest	17.1	11.09	1.83	Efektiv
Postest	24.2			

(Source: Researcher Document, 2024)

Based on the information on the results of the effectiveness test above, it was found that the value of tcount > ttable (11.088 > 1.83), thus the boccia ball development product for children with special needs and disabilities at SLB D YPAC Palembang City is effective in improving boccia game skills.

Field Test

The final field trial involved 20 SLB D.D1 YPAC students in Palembang City. The results of the effectiveness test can be seen in the table below:

Table 4. Effectiveness of Early Test

Test	Mean	Tcount	Ttable	Information
Pretest	16.8	13.17	1.72	Efektiv
Postest	25.4			

(Source: Researcher Document, 2024)

Based on the information on the results of the effectiveness test above, it was found that the value of tcount > ttable (13.17 > 1.72), thus the boccia ball development product for children with special needs and disabilities at SLB D YPAC Palembang City was effective in improving boccia game skills.

Final Product Revision

There are no revisions to the implementation of field trials at either the early test stage or the field test stage. The product can be utilized properly based on the results of the exercise, where there are changes in the pretest and posttest scores at each stage of the trial.

Desimination

After going through the validation process, field trials and revisions, the final development product can be displayed in the form of a modified boccia ball with the specifications depicted in the table below:

Table 5. Boccia Ball Modification Specifications

Variable	Development Aspects	Indicator	Specification	Modification
Boccia Ball	Heavy	Standard	270gr +/- 12gr	Fixed size weight
				The diameter of the circle is fixed
				Latex based material
		Burden	270gr +/- 12gr	Fixed size weight
				The diameter of the circle is fixed
				Rubber based material

(Source: Researcher Document, 2024)

The final ball results can be seen in the image below:

Figure 2. Boccia Ball Modifications
(Source: Researcher Document, 2024)

Based on the table and picture above, the finished result of the modified boccia ball is explained that the ball has a weight with a fixed size, the diameter has a fixed circle, changes occur in the basic material of the ball, namely latex. The fixed size is in accordance with the official standard for the size and circle of the ball used as match material, namely 270g.

DISCUSSION

The data and results of the analysis above provide an illustration that coaches and athletes can use the product resulting from the development of the boccia ball because scientifically it has had a good impact on the boccia playing skills of children with special needs and disabilities at SLB D.D1 YPAC, Palembang City. This change in impact occurred when the quality of the boccia game increased in terms of playing skills. Students' skills in placing the ball are different after being given training using the boccia ball as a development medium.

This research certainly complements several previous studies where previous research has never carried out the development of a ball that can be used for training. Development is carried out only to modify the form of the game so that it can be adapted to both normal children and ABK for PJOK teaching and learning activities. For example, research (Puspitaningsari et al., 2022), then research (Cindy, 2017), research (Rohmah et al., 2024), research (Fazari et al., 2023).

The research above is research where the emphasis is on modifying the form of the game to suit the patient's condition and condition to be used as PJOK teaching material, while the development of a type of ball that can be used for training needs has not yet been discovered. In fact, the importance of a large number of ball facilities or media

really supports the quality of training in order to achieve competitive goals in the boccia sport for children with special needs in the YPAC environment in Palembang City.

The results of the research carried out by researchers are certainly different from the results of previous research where the specifications for developing boccia balls can be used as a training medium with the principle of novelty. The novelty of this research when compared with previous research is that the developed boccia ball is able to achieve the expected match results, get used to adapting to a ball that has a standard weight, provides sufficient media for balls that are lacking for practice, trains accuracy with a ball that has a standard weight, adapts to situations a ball with a circle in fact, an adjustment to the ball being made from rubber, an alternative to the lack of sales of leather balls in Indonesia.

The results of the development of modifications to the boccia ball have elements that are different from the boccia balls used in competitions. Real balls have material specifications made of latex or leather. The color of the ball is red, blue and white as the jack ball. The difference can be seen in the basic material of the ball, the ball being developed is made from rubber. Meanwhile, the colors of the balls that were developed were red, blue and yellow as jack balls. The product developed for modifying the boccia ball for children with special needs, the disabled type at SLB-D.D1 YPAC, Palembang City, has the advantage of being able to improve the performance of boccia sports athletes in the city of Palembang. Helping coaches overcome deficiencies in the aspect of training facilities, namely very minimal football equipment. And help accelerate the development of Boccia's sporting achievements in Palembang. Meanwhile, the shortcomings of the developed product can be seen that the boccia ball is only an alternative that can be used as a training medium, not an official match medium, therefore, even though it is similar, the situation of using the ball allows a level of accuracy that is not yet in accordance with the actual match pattern.

Although in essence this research proves that the boccia ball development product is able to improve boccia playing skills in children with special needs and disabilities at SLB D YPAC Palembang City, the researchers faced several research limitations, for example the researcher had difficulty finding a ball that had a circle that met the original standards. worn during boccia matches. Researchers have difficulty finding instruments for assessing boccia playing skills that have standard standards from previous research. So the researchers modified the new skills instrument.

CONCLUSION

Based on the data analysis above, this research concludes that the development product has the meaning that it is very suitable for use because the research results from media expert validation have a value of 100% which is very valid and game experts have a value of 91.67% which is very valid. Meanwhile, the average validation value

for boccia ball development products is 95.8%, which is very valid. The results of the effectiveness test explained that the boccia ball developed had an effect on improving the boccia game skills of children with special needs at SLB-D.D1 YPAC Palembang City. With changes in skill values after being given training. The use of this product is able to improve performance for boccia sports athletes in the city of Palembang. Helping coaches overcome shortcomings in terms of training facilities, namely very minimal football equipment and helping accelerate training for Boccia sports achievements in Palembang.

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