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Modifying Plastic Balls in Seated Volley Ball Games for the Disabled

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Abstract: Special education for the disabled requires facilities or learning media as a supporting tool in teaching and learning activities. The lack of volleyball media for the disabled makes learning less effective and efficient because volleyball is not efficient for students with disabilities. There needs to be a modification of the ball that is safe and comfortable for the disabled. This study aims to determine how to make a modification of a plastic ball as a supporting tool for volleyball learning media for the disabled. A modified plastic ball with a size 4, weighing 185 grams, a reflectivity of 83 cm from 120 cm is provided as a solution media for volleyball learning. The methods used are preparation, implementation, and evaluation. Learning using modified plastic ball media is very helpful in learning in terms of balancing a sense of security and pleasure with students, the ball is easy to play according to students of Harapan Pelangi Kalisat Special School, and as a supporting tool for volleyball learning for students with disabilities.

Keywords: learning; difabel; volley ball; school; facilities

INTRODUCTION

Humans were created as the most perfect living beings compared to other creatures. Therefore, every human being is entitled to the same basic human rights. With this gift from God Almighty, humans can use their reason and thoughts to learn and acquire knowledge to improve their quality of life, one of which is through education. Education is a basic and universal right of every individual, including people with disabilities. In Indonesia, inclusive education has become part of the national policy commitment, but its implementation on the ground still faces many challenges. This paper aims to discuss in depth the challenges, strategies, and implementation of inclusive education for people with disabilities (Absor 2025). Education plays an important role in improving the quality of human resources, and the right to education does not only apply to children in general, but also to children with special needs (Pandu 2025).

Education in Indonesia is intended for everyone, from young children to adults, and even for people with disabilities. Education doesn't just come from school, but also from social interactions within society. Furthermore, education has no age restrictions; it's aimed at all groups and ages. Not all children are born perfect; some children experience challenges in both physical and mental development. (Sukriadi 2020). Inclusive education means that children with disabilities have the right to the same services as normal children without discrimination. (Widiyanto 2021). Adaptive physical education for people with disabilities requires adjustments to facilities and infrastructure to ensure safe, effective, and inclusive learning. One adaptive sport that is rapidly developing in the disabled community is sitting volleyball. Designed for individuals with limited lower limb mobility, the playing techniques, court dimensions, and net height have been modified to meet the needs of athletes with disabilities. Adaptive learning facilities are an important component in supporting the implementation of inclusive physical education for students with disabilities (Prasetiya 2025).

Alternative approaches, such as different methods and tools, are essential to enhancing the learning process. Adapting materials to meet individual needs can be one way to overcome challenges in teaching volleyball (Siregar 2021). Equipment modification is the most frequent modification carried out by a physical education teacher in the learning process (Sodikin 2020). Sitting volleyball as a disability sport remains under-recognized among elementary school students, especially those with special needs.

Inclusive physical education requires effective learning media to introduce this sport (Wijanarko 2025). In the practice of sitting volleyball, especially during the introduction and mastery of basic techniques, the use of standard volleyballs often presents a challenge for students with disabilities. Standard balls have relatively high weight, air pressure, and bounce speed, which can complicate movement control, reduce self-confidence, and increase the risk of injury for novice students with disabilities. This situation demands innovative learning media that are more user-friendly and tailored to the physical characteristics and motor skills of students.

As time goes by, the physical education learning model has undergone significant changes from a traditional approach to a more modern one, but many students still have low interest in learning volleyball. (Ramadhana 2024). One alternative solution that can be implemented is modifying a plastic ball as a learning medium for sitting volleyball. The modified plastic ball has the characteristics of being lighter, having a softer surface, and a slower bounce than a standard volleyball. These characteristics are very suitable for people with disabilities because they make it easier for students to perform basic techniques such as underhand serves, underhand passes, and ball control, while reducing the fear of impact. Furthermore, the use of a modified plastic ball allows for increased contact frequency, making the learning process more active and student-centered. This plastic ball modification is also in line with the adaptive learning principles recommended in the development of sports for people with disabilities by the NPC, namely adapting equipment to individual abilities without losing the essence of the basic movements of the sport being taught.

Students with disabilities can gradually understand the concept of sitting volleyball before moving on to using a standard ball according to official match regulations with the right media,. To optimize the learning process, the use of a portable net with adjustable height is also an important support. The portable net allows adjustment of the net height according to the abilities of students with disabilities and the learning stage, and facilitates the implementation of learning in various environments. The combination of modified plastic balls and portable nets is expected to create a safe, fun, and inclusive sitting volleyball learning. Thus, the study of modified plastic balls as a learning medium for sitting volleyball for people with disabilities is important to develop. This innovation is expected to improve the effectiveness of learning, motor

skills, and active participation of students with disabilities, while supporting the development of adaptive sports.

METHOD

Action research or action research is a form of research design, in action research the researcher describes, interprets and explains a situation at the same time as making changes or interventions with the aim of improvement or participation (Bruheim 2025). Traditionally, action research is a problem-solving research framework where researchers and clients collaborate to achieve goals. Action research is an activity or action to improve something, the planning, implementation, and evaluation of which are systematically carried out so that its validity and reliability reach the research level. Action research is also a process that includes a cycle of actions, based on reflection, feedback, evidence, and evaluation of previous actions and the current situation.Action research to contribute to a practical problem solving in urgent problematic situations in achieving the goals of social science through joint collaboration in the most accepted ethical framework (Safrida 2025).

Research subjects are a crucial part of obtaining information in a study. These subjects are objects, things, or people to which the data for the research variables are attached and which become the research problem. Research subjects are not always people but can also be objects, places, or activities (Nurfaizah 2025). In this study, the subject was a plastic ball modified into a volleyball as a supporting tool for sitting volleyball learning for the disabled. The research procedure for making the modified plastic ball involved several steps: preparation, implementation, and evaluation. The materials required for making the modified plastic ball included a plastic ball, a rubber ball, duct tape, a cutter, scissors, a ball cop, and a pump.

The implementation of the plastic ball modification media is made of rubber balls, plastic balls, and duct tape. There are two layers plus one more layer with duct tape. The layers of the plastic ball modification are the inside of the rubber ball and the outside of the plastic ball. In the modification of the plastic ball, the inside is made of rubber balls to increase the bounce and weight of the ball, while the outside is made of plastic balls to reduce pain. Covered with duct tape in the end, but not completely, so the reduction of pain when receiving the ball is very effective.

How to make a modified plastic ball learning media, the following stages of making a modified ball prepare the materials for making a plastic volleyball, then split the plastic ball using a cutter about 3 cm, use scissors to make a hole in the part that has been split so that it forms a diameter of about 3-5 cm, take a rubber ball then put it in a plastic ball that has been perforated and position the air hole to be filled with air, when the rubber ball has been inserted into the plastic ball, fill the rubber ball that has been inserted into the plastic ball by pumping it to fill it with air until it expands to the maximum, close the hole in the rubber ball, the final stage is finishing by taping the hole, do it evenly and the plastic volleyball is ready to be used for learning sitting volleyball for the disabled.

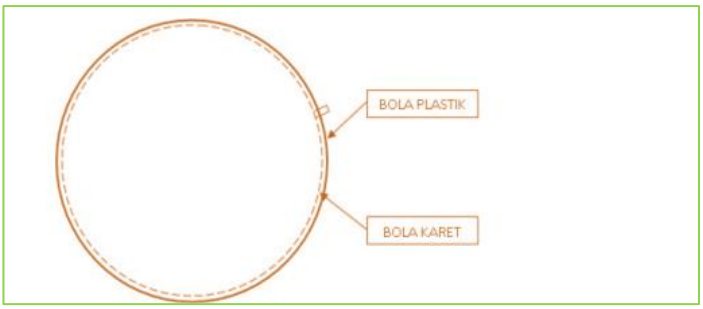

Figure 1. Modification of a plastic ball for the disabled

This modification of learning media is expected to encourage students to enjoy exercise during the lesson. Media that does not hinder students with disabilities from practicing will facilitate smooth teaching and learning activities. Teachers who deliver the material will deliver both theoretical and practical material during the lesson and all students with disabilities can be pro-active when learning sitting volleyball.

Figure 2. Modified Plastic Ball

Media is a tool or means used to assist the teaching and learning process, thereby assisting educators in delivering instruction. In education, media plays a crucial role as a means of conveying learning materials to students. (Wahyuni 2025). In the learning

process, media serves as a carrier of information from the source (teacher) to the recipient (student). Media is essential for educators in delivering material as a learning support tool, so there needs to be a substitute for volleyball to ensure smooth learning if at any time there are obstacles with existing facilities. Modification is considered one of the things that can help teachers during the teaching and learning process, given the limitations of the school or the needs of students during learning activities. Learning modification is a form of creativity that can be done to modify learning by applying various learning techniques and models (Hidayat 2025).

Modifications are needed to utilize affordable, environmentally friendly, and readily available materials to deliver learning materials without interruption. These modifications can also attract students' attention, as the creativity generated as learning support media will add value to their motivation. If students enjoy learning, especially during practice, it will be easier for educators to convey the material. Game modifications are crucial in efforts to increase student learning motivation. Modifying games in Physical Education (PJOK) learning is an innovation and a necessity to engage students in learning, thus motivating them and making the learning process more effective and efficient (Putri 2024). The following table shows the modifications of plastic balls:

Table 1. Comparison of plastic volleyball modifications

No	Ball Criteria	Volleyball	Plastic Ball
1	Weight	270g	180g
2	Size	5	4
3	Bounce	85cm	82cm
4	Balance	Stable	Quite Stable

Responsive media plays a significant role in shaping public perception. Encouraging media outlets to portray children with disabilities realistically and positively, and to share their inspiring stories, can help change public attitudes.(Sari 2024). Modification is one way teachers can ensure the learning process reflects developmentally appropriate practice (DAP). This means that the learning tasks presented must take into account changes in the child's abilities or conditions and can help encourage change. The benefits of modifying a plastic volleyball for teaching and learning activities include conveying lessons about the sport of volleyball and encouraging the understanding that learning can be done in any way appropriate to the situation (Yulita 2024).

If the learning delivered can provide a sense of enjoyment to students, it can provide positive energy. By using a modified plastic ball, students do not need to be afraid when doing underhand passes because the ball is light and suitable for beginners. The use of this plastic volleyball can make it easier for sports teachers to convey material using plastic volleyball media. The most important benefit is that teaching and learning activities with volleyball game material and practice can run according to plan and can develop students' interests and talents in sports and achievements in the sport of plastic volleyball. The benefit for students is that it makes it easier for beginners to learn volleyball because with a real volleyball it will be painful to play, but with this modified volleyball will reduce pain or even eliminate it. And also for special needs students, using this modified plastic volleyball is very easy because the ball is not heavy enough to play.

Learning media that facilitate students in practicing, they can achieve the true goal of sports education at the SLB school level, namely that students enjoy exercising and can enjoy playing volleyball despite their limitations. Cheap, safe, and comfortable manufacturing means that volleyball learning activities for the disabled can use modified plastic balls as supporting tools so that students will be accommodated in sitting volleyball learning with effective and efficient learning activities. Instilling a sense of joy in students in sitting volleyball learning. Therefore, media that is appropriate for SLB students is needed. Here is a comparison of volleyball with a modified plastic ball:

Table 2. Differences between volleyballs and modified volleyballs

Media	Lack	Excess
Volleyball	a. The ball is heavy and painful b. Not suitable for disabled people because their hands can turn red c. Expensive price	a. Large reflective power b. Economical Price
Plastic Ball (Modified)	a. The ball cannot resemble the original in terms of weight and bounce. b. The bounce is lacking.	a. The ball is light and painless b. The affordable price can accommodate the number of students c. Suitable for beginners and children because it doesn't feel too much on the hands d. An effective and efficient learning media support tool

The right learning modification media with modified plastic balls for the disabled as a learning tool to overcome the lack of facilities for volleyball learning media for the disabled and physical limitations. It is very appropriate to use modified plastic balls because they are adapted to SLB students during learning, in addition to being a supporting tool for volleyball learning, modified plastic balls are very good to use as a learning medium, especially for students with disabilities because the ball is light and made of plastic, using a real volleyball sometimes makes you feel inferior and hurt when playing it, with modified plastic balls it will reduce the pain because the material is plastic and the ball is light, with this the learning and practice process can run according to educational goals and can instill a sense of joy in sports in SLB students.

RESULT AND DISCUSSION

Modifying plastic balls into volleyballs as a supporting tool for volleyball learning in special needs schools is a challenge, as the limited number of volleyballs is perceived as hindering teaching and learning activities. The imbalance between the number of balls and the number of students makes some students unhappy and less active in learning. Furthermore, with students with physical limitations and disabilities, playing real volleyball is difficult due to the weight and pain when hitting the hand. Therefore, there is a need for a volleyball modification that is suitable for special needs students and can be produced independently at a low price so that students and the ball are balanced and learning can run smoothly.

By modifying a plastic ball into a volleyball, learning will be more effective and efficient in delivering volleyball material for people with disabilities. The lightweight, pain-free ball will engage special needs students and engage them actively in volleyball lessons. The results of this plastic ball modification are expected to serve as a reference for educators in teaching and learning activities when they encounter obstacles with balls. This will especially help physical education educators in special needs schools choose learning media that are appropriate for their students and can capture their interest. This will ensure a pleasant learning atmosphere, as students enjoy, feel safe, and comfortable participating in sitting volleyball lessons.

CONCLUSION

Teaching and learning activities in schools will run smoothly if they have appropriate learning media as supporting facilities. Special Needs Schools in Kalisat

District still face a shortage of learning media, particularly sitting volleyball. Sitting volleyball learning media requires ball facilities commensurate with the number of students. The problem at Special Needs Schools in Kalisat District is the lack of disability-friendly sitting volleyball learning media, which hinders teaching and learning activities.

The appropriate solution is to create modified plastic balls as a learning tool to address the lack of existing facilities. For schools that lack sitting volleyball learning facilities for disabled students, modified plastic balls are highly suitable because they are safe and comfortable for students with disabilities. As a supporting tool for sitting volleyball learning, modified plastic balls are excellent for use as learning media for disabled students. While using a real volleyball can cause fear and pain, modified plastic balls reduce pain due to the plastic material and lightweight ball, creating a fun, safe, and comfortable atmosphere for students with disabilities.

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