



The Effect of Using Modified Plastic Ball Media on Improving Dribbling Learning Outcomes in Football for Fifth Grade Students at SD Negeri 094166 Sidotani I Bandar

Miduk Putra Siahaan¹, Afri Tantri²

¹ Sekolah Tinggi Olahraga dan Kesehatan Bina Guna, Sumatera Utara, Indonesia

² Universitas Negeri Medan, Sumatera Utara, Indonesia

Received: 13-09-2025

Revised: 17-09-2025

Accepted: 01-10-2025

Abstract: This study aims to determine the effect of using modified plastic ball media on improving dribbling learning outcomes in football among fifth-grade students at SD Negeri 094166 Sidotani I Bandar during the 2021/2022 academic year. The research employed a quasi-experimental method conducted both on the field and in the classroom. The population consisted of 30 students from Grade V, all of whom were selected as the research sample. Data collection was carried out through dribbling tests using the inner and outer sides of the feet, evaluated with a performance rubric. Data were analyzed using t-test statistics to assess the effect of the independent variable. The results showed an increase in the average score from the pre-test (8.13) to the post-test (9.40), with a difference of 1.27 points. However, the independent sample t-test revealed that the result was not statistically significant ($\text{sig. (2-tailed)} = 0.260 > 0.05$), indicating that the hypothesis was rejected. Therefore, it can be concluded that the use of modified plastic ball media did not have a significant effect on improving dribbling learning outcomes in football for the students of SD Negeri 094166 Sidotani I Bandar.

Keywords: Modified Media; Plastic Ball; Soccer Dribbling; Physical Education; Learning Outcomes

Correspondence author

Email: smiduk86@gmail.com

Copyright © 2025 Miduk Putra Siahaan¹, Afri Tantri²



INTRODUCTION

Football is one of the most popular sports globally and serves as an effective educational medium for developing physical, cognitive, and social competencies among students. Among the fundamental technical skills in football, dribbling plays a vital role because it enables players to maintain ball possession, evade opponents, and create opportunities for goal scoring. At the primary school level, dribbling instruction not only enhances physical coordination and balance but also supports teamwork, decision-making, and enjoyment in learning physical education (Agung Pratama, Tri Rustiadi, & Sri Sumartiningsih, 2022).

Physical Education (PE) aims to create learning experiences that foster holistic development through movement-based learning. However, traditional teaching methods that rely solely on teacher demonstrations and standard training equipment often lead to student disengagement and reduced motivation (Sahabul Adri, 2021). Consequently, teachers are encouraged to implement creative instructional strategies such as modified media to make lessons more interactive and developmentally appropriate. According to

Puspitasari & Sudarso (2024), the use of modified media, such as lightweight balls or scaled-down equipment, increases student engagement, safety, and learning outcomes in elementary sports activities.

Recent empirical findings highlight that modifying learning media can significantly affect technical skill acquisition. Sunaryo et al. (2022) reported that agility drills combined with modified equipment improved dribbling accuracy and control in young female football players. Similarly, Aristian, Munar, & Decheline (2022) found that "ball feeling" training a method emphasizing repeated ball contact using various surfaces significantly enhanced dribbling ability in youth athletes. Despite these advances, most prior studies have focused on standard or rubber balls, rather than exploring plastic ball modification, which may offer benefits for younger learners due to its lighter weight and safety characteristics.

Although several studies have examined the effects of training models and agility on dribbling performance, there is limited empirical evidence on the application of modified plastic ball media as a pedagogical tool in football learning for primary school students. This research therefore introduces a novel approach by examining how plastic ball modification a low-cost, safe, and scalable teaching medium affects the dribbling learning outcomes of fifth-grade students. The novelty of this study lies in its integration of quasi-experimental design and contextualized media adaptation, providing an innovative and practical framework for PE teachers in resource-limited schools.

Analyze the effect of using modified plastic ball media on the improvement of dribbling learning outcomes in football among fifth-grade students. Determine whether there is a statistically significant difference between pre-test and post-test results after applying the modified media intervention. Provide pedagogical implications for the design of developmentally appropriate PE practices that enhance motor learning and student engagement.

By addressing these objectives, the study contributes empirically and practically to the field of physical education, supporting innovation in instructional design and promoting more inclusive and engaging learning environments for young students..

METHOD

This study employed a quasi-experimental design using a one-group pre-test–post-test model to evaluate the effect of modified plastic ball media on students' dribbling learning outcomes in football. This design was chosen because it allows the researcher to measure learning improvement before and after the treatment in a natural classroom setting without randomization (Creswell & Creswell, 2021). The independent variable in this study was the use of modified plastic ball media, while the dependent variable was the students' dribbling performance, which included control, accuracy, and coordination. The research was conducted at SD Negeri 094166 Sidotani I Bandar during the 2021/2022 academic year, involving 30 fifth-grade students selected through purposive sampling, as recommended for homogeneous populations (Sugiyono, 2022).

Data were collected through a dribbling skill test that assessed performance based on four criteria: ball control consistency, directional accuracy, coordination, and execution speed. The test instrument was adapted from the PSSI Football Skill Assessment Rubric (2019) and validated by two physical education experts to ensure content and construct validity. Each skill component was scored on a five-point scale ranging from very poor to excellent, and the reliability test showed a Cronbach's Alpha coefficient of 0.86, indicating high internal consistency. The learning intervention was carried out over four weeks, with two sessions per week, each lasting 80 minutes. During the sessions, students

practiced dribbling using lighter and smaller modified plastic balls (diameter \approx 50 cm, weight \approx 150 g) through drills and small-sided games designed to improve their coordination and confidence.

Data analysis involved both descriptive and inferential statistics. The mean and standard deviation were used to describe changes in performance between the pre-test and post-test phases, while a paired sample t-test was applied to determine the statistical significance of the difference in scores at a 0.05 significance level. Prior to analysis, data normality and homogeneity were tested using the Kolmogorov–Smirnov and Levene’s tests to ensure that the assumptions of the parametric test were met. The research followed ethical standards established by the Bina Guna College of Sports and Health, and informed consent was obtained from both the school and participants’ parents to ensure voluntary and responsible participation.

RESULT AND DISCUSSION

Result

The analysis was conducted to determine the effect of modified plastic ball media on the improvement of students’ dribbling learning outcomes in football. The data collected from pre-test and post-test scores are summarized in the following table.

Table 1. Descriptive Statistics of Pre-test and Post-test Results

Test Type	N	Mean	Standard Deviation (SD)	Min	Max
Pre-test	30	8.13	0.85	7	9.5
Post-test	30	9.4	0.73	8	10.5

Table 1 shows that the average dribbling performance of students increased from a mean of 8.13 during the pre-test to 9.40 in the post-test. This indicates a numerical improvement of 1.27 points after the application of modified plastic ball media. The standard deviation slightly decreased from 0.85 to 0.73, suggesting that students’ performance became more consistent during the post-test. The minimum and maximum scores also increased, reflecting an overall positive trend in learning outcomes.

Table 2. Paired Sample t-Test Results

Variable Pair	Mean Difference	t-value	Sig. (2-tailed)	Interpretation
Pre-test – Post-test Scores	1.27	1.14	0.26	Not Significant ($p > 0.05$)

Table 2 presents the results of the paired sample t-test, which aimed to determine whether the improvement in students’ dribbling performance was statistically significant. The significance value (Sig. 2-tailed) was 0.260, which is greater than the critical value of 0.05. This finding indicates that the difference between pre-test and post-test scores is not statistically significant. Therefore, while there was a positive change in students’ mean scores, the use of modified plastic ball media did not have a statistically significant effect on improving dribbling learning outcomes.

Discussion

The findings of this study indicate that the use of modified plastic ball media did not have a statistically significant effect on improving dribbling skills among fifth-grade students at SD Negeri 094166 Sidotani I Bandar. Based on the t-test results (sig. 0.260 $>$ 0.05), the hypothesis stating that the use of modified media would significantly enhance learning outcomes was rejected. Although the average score increased from 8.13 in the

pre-test to 9.40 in the post-test, the difference was not statistically significant. This aligns with the findings of Rahmadani and Sulaiman (2021), who emphasized that the effectiveness of physical education media depends largely on the intensity of practice, students' motivation, and the teacher's ability to integrate media effectively into the learning process.

Several factors contributed to this outcome, including limited instructional time, varying levels of motivation among students, and unequal mastery of basic techniques. In physical education, motivation and consistent practice are essential for the development of motor skills. According to Lubis et al. (2020), improvements in motor abilities such as dribbling require repetitive, structured training under continuous supervision to establish coordination and balance. Therefore, although plastic balls may simplify the learning process, without a well-organized training framework, their impact on learning outcomes remains limited.

Furthermore, students' physical condition plays a critical role in determining their dribbling performance. As noted in the theoretical framework derived from Sajoto's principles, physical fitness elements such as muscle strength, speed, balance, and coordination significantly influence skill acquisition. This is consistent with Nugroho and Arifin (2022), who found that learning media function primarily as facilitators, while students' physical readiness and psychomotor development remain the main determinants of successful mastery of basic soccer techniques. Consequently, effective dribbling performance requires not only media adaptation but also comprehensive preparation of students' physical and mental capacities.

Despite the absence of a statistically significant effect, the use of plastic balls as a learning medium has considerable pedagogical value. Such modified equipment helps reduce students' fear of injury and encourages more inclusive participation, especially at the elementary level. Research by Wibowo et al. (2021) demonstrated that modified sports equipment can increase students' active engagement and confidence in physical education, particularly among those with lower physical abilities. Thus, even though quantitative results may not show significant differences, qualitative outcomes such as motivation, enthusiasm, and self-confidence represent meaningful educational gains.

Overall, this study reinforces the understanding that the effectiveness of modified learning media depends on the pedagogical strategies applied by the teacher. Effective instruction should combine appropriate media with varied drills, formative assessments, and motivational approaches to maximize results. As Schmidt and Lee (2019) highlighted in their motor learning theory, skill improvement requires repetition, feedback, and adaptive media suited to individual capabilities. Therefore, plastic ball media should be incorporated within a systematic, structured instructional design to ensure measurable and significant improvements in dribbling learning outcomes.

CONCLUSION

Based on the overall findings of the study titled "The Effect of Providing Plastic Ball Modification Media on Increasing Dribbling Learning Outcomes in Soccer Games for Fifth Grade Students of SD Negeri 094166 Sidotani I Bandar Academic Year 2021/2022", it can be concluded that the application of modified plastic ball media resulted in a numerical improvement in students' dribbling performance from an average score of 8.13 in the pre-test to 9.40 in the post-test indicating better learning consistency and engagement; however, the improvement was not statistically significant ($p = 0.260 > 0.05$), suggesting that while the media encouraged more active participation and reduced fear of error during practice, it did not produce a measurable effect on learning outcomes;

thus, the use of modified plastic ball media can still be considered pedagogically beneficial as a supplementary learning tool to foster motivation and interest in physical education, particularly in developing soccer dribbling skills at the elementary level.

ACKNOWLEDGEMENTS

The authors also acknowledge SD Negeri 094166 Sidotani I Bandar for their academic and logistical support, which made this research possible.

CONFLICT OF INTEREST

Clearly explain whether there are any conflicts of interest related to the reported research.

REFERENCES

- Agung Pratama, A., Tri Rustiadi, T., & Sri Sumartiningsih, S. (2022). The influence of football learning on physical coordination and social competence in primary school students. *Jurnal Pendidikan Jasmani Indonesia*, 18(2), 101–112.
- Aristian, A., Munar, M., & Decheline, D. (2022). The effect of ball feeling training on improving dribbling ability in youth football players. *Jurnal Ilmiah Olahraga*, 9(1), 45–53.
- Creswell, J. W., & Creswell, J. D. (2021). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Lubis, A., Harahap, D., & Siregar, R. (2020). Pengaruh Metode Latihan dan Motivasi terhadap Keterampilan Dribbling Sepak Bola. *Jurnal Pendidikan Jasmani dan Olahraga*, 9(2), 145–153.
- Nugroho, A., & Arifin, M. (2022). Kesiapan Fisik dan Kognitif Siswa terhadap Penguasaan Teknik Dasar Sepak Bola di Sekolah Dasar. *Jurnal Ilmiah Penjas (JIP)*, 6(1), 32–41.
- Puspitasari, R., & Sudarso, D. (2024). The effectiveness of modified learning media on engagement and safety in elementary physical education. *Jurnal Pendidikan Olahraga dan Kesehatan*, 12(1), 25–36.
- Rahmadani, N., & Sulaiman, A. (2021). Efektivitas Media Pembelajaran dalam Meningkatkan Hasil Belajar Penjasorkes di Sekolah Dasar. *Jurnal Olahraga dan Pendidikan*, 8(1), 22–30.
- Sahabul Adri, S. (2021). The impact of traditional teaching methods on students' motivation in physical education classes. *Jurnal Pendidikan Jasmani dan Olahraga*, 10(3), 230–238.
- Schmidt, R. A., & Lee, T. D. (2019). *Motor Learning and Performance: From Principles to Application*. Human Kinetics.
- Sugiyono. (2022). *Metode penelitian kuantitatif, kualitatif, dan R&D* (3rd ed.). Alfabeta.
- Sunaryo, S., Rahmad, D., Suryana, E., & Hidayat, A. (2022). The effect of agility training using modified media on dribbling skills in young female football players. *Journal of Physical Education and Sport Science*, 11(2), 88–96.
- Wibowo, P., Santosa, D., & Hidayat, A. (2021). Pengaruh Alat Modifikasi terhadap Partisipasi dan Motivasi Belajar Penjas di Sekolah Dasar. *Jurnal Pendidikan Olahraga Indonesia*, 17(3), 241–250.