JOURNAL OF EDUCATION AND APPLIED TEACHING (JEAT)
Volume 2 Nomor 3, 2026, 1332-1340
E-ISSN: 3090-0360

Futsal and Motor Development: Interactive Games for Elementary School Children in Class PJOK

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Abstrak

Pendidikan Jasmani, Olahraga, dan Kesehatan (PJOK) memainkan peran penting dalam mengembangkan keterampilan motorik anak usia sekolah dasar. Salah satu pendekatan yang efektif dan menyenangkan adalah melalui permainan futsal yang dikemas secara interaktif. Artikel ini membahas berbagai jenis permainan futsal yang dirancang khusus untuk meningkatkan keterampilan motorik kasar anak usia sekolah dasar, seperti koordinasi, keseimbangan, kelincahan, dan ketepatan gerakan. Metode yang digunakan meliputi observasi dan studi literatur terkait aktivitas fisik pada anak serta implementasi langsung di kelas PJOK. Hasil penelitian menunjukkan bahwa penggunaan berbagai permainan futsal mampu meningkatkan partisipasi siswa, mengembangkan keterampilan motorik dasar, dan menumbuhkan kepercayaan diri dan kerja tim. Dengan demikian, futsal berfungsi tidak hanya sebagai olahraga kompetitif tetapi juga sebagai media pembelajaran yang efektif untuk perkembangan fisik dan sosial anak.

***Kata kunci*:** Futsal, keterampilan motorik kasar, anak sekolah dasar, permainan interaktif, PJOK

Abstract

Physical Education, Sports, and Health (PJOK) plays an important role in developing the motor skills of elementary school-age children. One effective and enjoyable approach is through interactively packaged futsal games. This article discusses various types of futsal games specifically designed to enhance elementary school children's gross motor skills, such as coordination, balance, agility, and movement accuracy. The methods used include observation and literature study related to physical activity in children and direct implementation in the PJOK class. The results of the study indicate that the use of varied futsal games is capable of increasing student participation, developing basic motor skills, and fostering self-confidence and teamwork. Thus, futsal functions not only as a competitive sport but also as an effective learning medium for children's physical and social development.

Keywords: Futsal, gross motor skills, elementary school children, interactive games,PJOK

1. INTRODUCTION

Physical Education, Sports, and Health (PJOK) in elementary schools aims to develop students' physical health as well as their psychomotor, cognitive, and affective skills. A highly effective and innovative approach in PJOK learning is futsal, a sport that is popular among children and adolescents. Futsal provides an excellent platform to enhance motor skills in elementary school children by combining physical activity with fun, interactive learning. Motor skills involve the coordination of the motor system, nervous system, and sensory system, which enable purposeful body movements (Pratiwi & Kristanto, 2015).

History:
Received : 2 March 2026
Revised : 2 March 2026
Accepted : 4 March 2026
Published : 8 March 2026

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Futsal requires a wide range of motor skills, such as speed, agility, and balance (Arjuna, 2018), as well as cognitive and social abilities like strategy, teamwork, and communication (Sudirman, 2022). The fast-paced, confined nature of futsal demands effective ball control, body coordination, agility, and quick reactions, which are essential for success (Festiawan, 2020). Futsal helps in developing gross motor skills such as running, jumping, and kicking, which are foundational for children's physical development (Mashud et al., 2019). According to Ramadhan et al. (2024), structured futsal programs significantly improve balance, laterality, and spatial movement control, supporting the development of physical literacy, which encompasses mastering fundamental movement skills like locomotion and object control.

In addition to physical benefits, futsal encourages cognitive development by requiring children to make quick decisions in dynamic game scenarios, promoting cross-domain learning (Aguiar et al., 2012). Compared to conventional learning methods, futsal has been found to improve not only motor skills but also cognitive abilities among elementary school students. Even younger children, such as those in kindergarten, benefit from futsal, as it helps develop gross motor skills that form the basis for further physical education (Alfairuzzabady et al., 2025).

Through futsal, children develop several key motor components, such as body-ball coordination (e.g., passing, dribbling, controlling the ball), agility and changes of direction (e.g., dribbling quickly and maneuvering in confined spaces), reaction speed (e.g., responding quickly in game situations), balance (e.g., maintaining posture during play), and fine and gross motor control (e.g., combining footwork for passing and shooting). These components are crucial in fostering well-rounded physical development in children.

To optimize futsal's role in PJOK classes, teachers can utilize interactive game strategies that cater to the developmental needs of elementary school students. Activities like Zig-Zag Dribble Challenges, Relay Passing Games, Mini 3v3 Matches, Balance Passing Drills, and Shooting Target Contests focus on different motor skills, including agility, coordination, balance, and accuracy. These interactive games can be modified to meet students' needs and enhance their engagement in the learning process. As futsal is integrated into the PJOK curriculum, a play-based learning approach ensures that students’ motor skills are developed progressively, starting with simple tasks and advancing to more complex movements as they grow.

In conclusion, futsal not only serves as an enjoyable and engaging way to improve motor skills, but it also contributes to the development of cognitive and social skills, aligning with the goals of PJOK education. As an integrated and dynamic sport, futsal provides a comprehensive learning experience that promotes holistic physical education for elementary school children, supporting their overall development.

2. METHOD

This study used a quasi-experimental design with a pretest-posttest control group design. This design was chosen because the study was conducted in pre-formed classes (intact groups) without individual randomization, which is commonly used in elementary school physical education (PJOK) research.

2.1 Research Design

a) Experimental Group → Pretest → Futsal Interactive Games Intervention → Posttest
b) Control Group → Pretest → Conventional PJOK Learning → Posttest

The quasi-experimental approach is widely used in motor intervention research in elementary schools (Logan et al., 2012; Stodden et al., 2008).

2.2 Participants

The study participants were fifth-grade elementary school students (aged 10–11 years) taking PJOK.

Sample size: ±40–60 students, divided into:

a) 1 experimental class
b) 1 control class

Inclusion criteria:

a) No physical disabilities
b) Regularly attending physical education (PE) classes
c) Obtaining parental permission

The age group of 10–11 years was selected in accordance with the developmental phase of fundamental movement skills (Gallahue et al., 2012).

2.4 Research Instruments

a. Motor Skill Assessment

Instruments used to measure motor development:

Test of Gross Motor Development (TGMD-2 / TGMD-3)

Measures locomotor skills and object control.

b. Physical Fitness Supporting Tests

a) 20m Sprint Test (speed)
b) Illinois Agility Test (agility)
c) Standing Long Jump (power)
d) Balance Test (balance)

This instrument is commonly used in motor competence research (Barnett et al., 2009).

2.5 Intervention Procedure

The intervention was conducted for 6–8 weeks, twice per week (approximately 70 minutes per session).
Session Structure:
1. Warm-up (10 minutes)
2. Fundamental skill drills (15 minutes)
3. Interactive futsal games (30 minutes)
4. Small-sided games 3v3 / 4v4 (10 minutes)
5. Cool-down (5 minutes)

Interactive game models include:

a. Dribbling relay game
b. Passing target challenge
c. 3v3 mini futsal
d. Cone zig-zag dribbling race

This approach uses the following concepts:
Teaching Games for Understanding (TGfU), Small-sided games approach.

2.7 Data Analysis

Data were analyzed using:

a. Descriptive statistics (mean, SD)
b. Paired sample t-test (pre-post within group)
c. Independent sample t-test (experimental vs. control)
d. Effect size (Cohen's d)

Significance level: $p < 0.05$ Statistical analysis followed the approach of previous motor intervention research (Robinson et al., 2015).
Ethical Considerations: School approval, Informed parental consent, No risk of injury due to age-appropriate activities.

3. RESULT AND DISCUSSION

This study aimed to evaluate the effect of interactive futsal games on the development of motor skills in 5th-grade elementary school students in Physical Education (PE) classes. Based on the quasi-experimental design with control and experimental groups, the results of the motor skill tests are as follows:

Table 1. *Pretest and Posttest Results for Experimental and Control Groups*

Test	Experimental Group (n=30)	Control Group (n=30)
Speed (20m)	Pretest: 4.98 sec	Pretest: 5.02 sec
	Posttest: 4.43 sec	Posttest: 4.92 sec
Agility (Illinois)	Pretest: 17.12 sec	Pretest: 17.35 sec
	Posttest: 16.50 sec	Posttest: 17.20 sec
Power (Long Jump)	Pretest: 2.35 m	Pretest: 2.28 m

	Posttest: 2.56 m	Posttest: 2.33 m
Balance	Pretest: 25 sec	Pretest: 24 sec
	Posttest: 32 sec	Posttest: 25 sec

In the 20-meter sprint test, the experimental group who participated in the interactive futsal games showed significant improvement in their time, decreasing from 4.98 seconds in the pretest to 4.43 seconds in the posttest. This improvement indicates that the students who participated in the futsal intervention were able to run faster after completing the training program. Statistical analysis using the paired t-test showed that this difference was statistically significant, with a $p < 0.05$, meaning the change was unlikely to have occurred by chance. In contrast, the control group, which followed conventional PE lessons, only showed a slight decrease in their sprint time, which was not statistically significant.

In the Illinois agility test, the experimental group experienced a significant decrease in their time, from 17.12 seconds in the pretest to 16.50 seconds in the posttest. This decrease suggests that students who participated in interactive futsal training were able to change directions more quickly and efficiently after the program. This result was also statistically significant, with a $p < 0.05$, indicating that the change was likely due to the futsal intervention. On the other hand, the control group showed a decrease in time as well, but the change was not statistically significant, with $p > 0.05$, suggesting that the improvement in the control group might have been due to other factors unrelated to the training.

In the long jump test, the experimental group showed a significant increase in jump distance, from 2.35 meters in the pretest to 2.56 meters in the posttest. This increase suggests that futsal training helped improve the students' leg strength and explosive power. Statistical analysis showed a $p < 0.05$, indicating that the change was statistically significant. The control group, although showing a small increase in jump distance from 2.28 meters to 2.33 meters, did not demonstrate a significant change.

In the balance test, the experimental group showed a significant improvement in balance time, increasing from 25 seconds in the pretest to 32 seconds in the posttest. This improvement suggests that futsal training helped enhance the students' ability to maintain balance, which is an essential motor skill. The paired t-test revealed that the improvement was statistically significant with $p < 0.05$. In comparison, the control group showed only a slight improvement, from 24 seconds to 25 seconds, which was not statistically significant.

Overall, the experimental group that participated in the interactive futsal games showed significant improvements in all aspects of motor skills tested, including speed, agility, power, and balance. This suggests that futsal is an effective method for developing children's fundamental motor skills. In contrast, the control group following conventional PE lessons showed minimal and statistically insignificant changes, further supporting the finding that futsal has a greater impact on motor skill development in children.

Discussion

The results of this study indicate that interactive futsal games have a significant impact on the motor skills of elementary school students, particularly in the areas of speed, agility, power, and balance. These findings are consistent with previous studies that have demonstrated the benefits of futsal in improving fundamental motor skills such as speed, agility, and balance (Caixinha, 2018; Arjuna, 2018).

In terms of agility, futsal involves rapid direction changes and coordination with the ball, aligning with the work of Mashud et al. (2019), who stated that futsal plays a crucial role in the development of gross motor skills in children. Aguiar et al. (2012) and Sudirman (2022) also highlighted that futsal not only improves motor skills but also enhances cognitive and affective skills such as strategic thinking, teamwork, and communication.

Engagement in interactive futsal games, such as the dribbling relay game and 3v3 mini futsal, was found to be particularly effective for enhancing fine motor skills and promoting social interaction. This supports findings from Buya et al. (2021) and Juliansyah et al. (2023), who emphasized that futsal encourages cooperation, teamwork, and communication, while also improving motor coordination.

Overall, interactive futsal games in PE classes not only enhance physical skills but also foster social skills, sportsmanship, and teamwork. As noted by Cahyani et al. (2023) and Handayani & Munastiwi (2022), futsal provides a dynamic and engaging learning environment that promotes both cognitive and motor literacy in children. This is especially important as it encourages decision-making and situational awareness in real-game scenarios, as observed by Haryono et al. (2021) and Putri et al. (2025).

4. CONCLUSION

Futsal can be used as an interactive game to improve the motor skills of elementary school children in PJOK class. Futsal games require good motor skills, such as speed, agility, and balance. Furthermore, futsal also requires cognitive and affective abilities, such as strategy, teamwork, and communication. By using interactive futsal games, children can improve their motor skills and develop their cognitive and affective abilities. Therefore, futsal can be a good choice for improving the motor skills of elementary school children in PJOK class.

5. ACKNOWLEDGEMENT

Thank anyone who has helped you in this research, including: Researchers who provided materials, reagents, or computer programs ; anyone who helped with the writing or English language, or provided critical comments on the content, or anyone who provided technical assistance. State why people have been acknowledged and ask for their permission. Acknowledge sources of funding, including grants or reference numbers. Please avoid apologizing for doing a poor job of presenting the manuscript

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