

Tiered Cardboard As An Innovative Medium In Pjok Learning To Improve Long Jump Skills

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Abstract

This study aims to improve the long jump skills of grade XII F6 students of SMA Negeri 12 Semarang through the application of innovative media in the form of multi-level cardboard in PJOK learning. The study subjects were 32 students (11 males and 21 females). Data were collected through long jump skill practice tests and observation sheets, then analyzed descriptively and quantitatively. The results showed that the average jump distance of students increased from 2.53 m in Cycle I to 2.91 m in Cycle II, or an increase of 0.38 m. In line with the increase in physical distance, the average score of class skills increased from 86.00 to 96.00. The level of classical learning completeness also increased significantly from 69% (22 students completed) in Cycle I to 100% (32 students completed) in Cycle II. Based on these results, the use

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of tiered cardboard media in a structured manner effectively improves basic movement skills (start, reject, hover, and landing) and the completeness of students' long jump learning.

Keywords: Movement Skills; Long Jump; Multi-Tiered Cardboard Media; Classroom Action Research; PJOK.

INTRODUCTION

Physical education, sports, and health (PJOK) is an integral part of the overall education system that aims to develop aspects of physical fitness, movement skills, reasoning, emotional stability, social actions, and healthy lifestyles (Rahmawati et al., 2024). Through PJOK learning, students have the opportunity to be directly involved in a variety of meaningful, structured, and fun movement experiences (Dudley et al., 2022). Effective PJOK learning not only focuses on achieving physical achievements, but also facilitates the formation of discipline, cooperation, and student confidence (Junaidi et al., 2026).

One of the main materials in the PJOK curriculum at the Senior High School (SMA) level is athletics (Fatma et al., 2025). Athletics is often referred to as the mother of sports because it includes basic human movements such as walking, running, jumping, and throwing (Cuciorovski & Enoiu, 2023). Among these athletic numbers, the long jump is one of the complex movement skills that must be mastered by students. Long jump is an explosive movement activity that aims to achieve the farthest possible jump distance from the pushboard to the landing sandbox through a series of sequential motions (Zhang et al., 2025).

The basic long jump technique consists of four main phases: preset, repulsion, hovering in the air, and landing (Čoh et al., 2017). The start is done by running at an accelerated pace towards the repulsion board to produce maximum horizontal speed (Ashcraft & Grabowski, 2026). Repulsion is a crucial transition period in which horizontal velocity is converted into vertical-diagonal thrust quickly and powerfully using one of the strongest support legs (Wei et al., 2026). The hovering stage requires control of the body's balance in the air to maintain optimal thrust, before ending with landing using both feet at the same time with the knees pressing to absorb the impact (Jasminan & Chandana, 2021). All of these stages are kinetic chains, where the success of one segment of motion directly affects the next (R. Irawan et al., 2025).

Based on initial observations (pre-action observations) on the PJOK learning process of grade XII F.6 students of SMA Negeri 12 Semarang, a number of fundamental obstacles were



found in mastering the long jump technique. Most students have difficulties when doing pushback; the support legs often do not fit on the push-board, the upward thrust is relatively weak, and coordination when hovering is still awkward. In addition, fear or hesitation arises in students when they want to lean and float, which has an impact on the low average jump distance and the lack of achievement of Learning Objectives (KKTP).

This problem emphasizes the need for innovative learning media that uses a scaffolding approach that can gradually provide visual stimulus and agility of movement (Junaidi et al., 2026). One of the simple, safe, economical, but highly effective alternative learning media is multi-level cardboard. Multi-level cardboard is used as a pioneer obstacle (obstacle learning) placed in front of the pushboard. With the cardboard obstacle set at a gradually adjusted height, students are visually encouraged to direct the jump up and forward and optimize the repulsion angle.

The use of modified media has been shown to create a challenging and interactive learning atmosphere while reducing student anxiety (Utomo & Maratus, 2021). Therefore, this class action research aims to analyze the improvement of basic long jump movement skills through the application of multi-level cardboard media among grade XII students at SMA Negeri 12 Semarang.

LITERATURE REVIEW

Physical Education, Sports, and Health

Physical, Sports, and Health Education (PJOK) is an educational process that utilizes physical activities as a medium to achieve comprehensive educational goals, covering the physical, mental, emotional, and social aspects of students (Raibowo et al., 2019) . Through PJOK, students are not only trained in movement skills, but also formed attitudes of discipline, cooperation, sportsmanship, and critical thinking skills in solving problems (Saputra et al., 2022) .Physical education is an educational process by seeking learning experiences through the form of physical movements that are carried out consciously, systematically, and even intensively to stimulate growth and development in physical, motor, way of thinking, emotional level, social state, and moral sense. Physical education is closely related to the learning and teaching process (Al Latif et al., 2023) .



Athletics in Physical Education

Athletics is one of the sports that is an important part of PJOK learning. Athletics includes various basic human movement activities, such as walking, running, jumping, and throwing (Cuciorovski & Enoiu, 2023). These movements are the basis for the development of motor skills and support the physical abilities needed in various sports activities.

In school learning, athletics has educational value because it can help students develop strength, speed, muscle explosiveness, coordination, balance, agility, and endurance (Fatma et al., 2025). In addition to physical aspects, athletic activities can also form attitudes of discipline, responsibility, courage, sportsmanship, and students' ability to face challenges during the learning process. Athletic learning needs to be carried out by paying attention to the stages of movement mastery, the level of students' ability, the availability of facilities and infrastructure, and safety aspects (Muntasir et al., 2024). Teachers can use a variety of learning methods and media to help students understand movement techniques gradually. Modification of learning media is one of the alternatives that can be applied when available sports facilities are still limited or when students need help mastering certain skills (Dwi Retno Aryaningtyas & Ismawandi B.P, 2022).

Long Jump Skills

The long jump is one of the numbers in athletics that aims to reach the farthest possible jump distance through a series of initial movements, pushbacks, hovering in the air, and landing (Dwi Retno Aryaningtyas & Ismawandi B.P, 2022). In PJOK learning, long jump skills are not only assessed based on the distance achieved, but also based on the ability of students to perform each stage of movement correctly. Technical assessment is needed to find out the parts of the movement that have been mastered and those that still need improvement. Based on this understanding, the long jump skill in this study is interpreted as the ability of students to perform a series of long jump movements in a coordinated manner, starting from beginning, repulsion, hovering, to landing, paying attention to the accuracy of the technique and the results of the jump distance. The use of multi-level cardboard media is directed to help improve mastery of the technique so that student learning outcomes can improve (Muntasir et al., 2024).



Multi-level Cardboard Learning Media

Learning media is any form of tools, materials, or means used to help teachers convey learning materials and make it easier for students to understand the information and skills learned (Podungge et al., 2022). The use of learning media aims to create a learning process that is more interesting, concrete, effective, and in accordance with the needs of students.

In Physical Education, Sports, and Health (PJOK) learning, learning media has an important role because most of the material requires practical experience and mastery of movement skills. The right media can help students understand movement instruction, gain hands-on learning experience, and increase opportunities to practice in a more targeted way (Zhou et al., 2021). PJOK learning media does not always have to be in the form of expensive or specially available sports equipment. Teachers can take advantage of simple materials that are easy to obtain and modify them according to learning objectives. Modification of learning facilities can be an alternative to overcome the limitations of facilities while providing a variety of movement activities to students (Han et al., 2022).

Multi-level cardboard media is a learning aid made from cardboard and arranged or modified into several levels of height for use in long jump training activities. This media is designed as an alternative to learning that is simple, easy to obtain, and relatively inexpensive compared to the use of special sports equipment (Muntasir et al., 2024). In this study, a multi-level cardboard media was placed in a predetermined exercise area, with its position adjusted to the direction of movement and the needs of the exercise. The media functions as a visual cue that helps students estimate the direction of movement and provides movement targets when rejecting and jumping.

The use of a multi-level cardboard box is expected to help students understand that the long jump movement is not only oriented towards forward horizontal movement, but also requires repulsion in the appropriate direction so that the body can move forward and upwards (Dwi Retno Aryaningtyas & Ismawandi B.P, 2022). Through exercises that are carried out gradually, students are expected to gain more directed movement experience and be able to correct technical errors. However, the effectiveness of multi-level cardboard media in improving long jump skills needs to be proven through observation and measurement during the implementation of Classroom Action Research (PTK) (PGRI Semarang et al., 2025). Its use is not a guarantee that students' skills will improve automatically, but rather an alternative learning actions that need to be evaluated.



RESEARCH METHOD

This research is a Class Action Research conducted during two repeated cycles (cyclic movement process). Each cycle consists of four main phases following the Kemmis & Taggart model: (1) Planning, (2) Acting Implementation, (3) Observing, and (4) Reflecting) (Rabgay & Kidman, 2023).

The research was conducted at SMA Negeri 12 Semarang during the odd semester of the 2026/2027 school year, lasting from June to August 2026. The study subjects were 32 students of Grades XII-F.6, consisting of 11 male students and 21 female students. Subjects were selected based on initial identification that showed large variations in the level of long jump skills, with the dominance of students below the mastery criteria.

The data collection instruments include a practical long jump skill test sheet (measuring jump distance and rubric assessment of the four basic techniques), a student learning activity observation sheet, and a reflection journal sheet. The assessment of basic techniques includes four main aspects, as described in Table 1:

Table 1. Indicators and Sub-indicators for Assessing Long Jump Skills

Technical Appearance	Sub-indicators of Indicators/Movements	Score Maximum
Prefix	Accelerated running speed, stride consistency, body position, and forward-looking focus.	20
Rejection	Accuracy of foot placement on board, strength of foot when pushed, extension of upward-forward repulsion angle.	20
Hovering	Body balance in the air, position of arms and legs when hovering.	20
Landing	Both legs land together, knees bent to absorb the impact, weight does not fall backwards.	20
Total Maximum Score		80

The final score of a student's practical skills is calculated based on the percentage of the score achieved relative to the combined maximum score, using the following standard formula:

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$$\text{Practical Skills Score} = (\text{Total Score Obtained} / \text{Maximum Score (80)}) \times 100 \text{ (1)}$$

The Criteria for Achieving Learning Objectives (KKTP/KKM) set at SMAN 12 Semarang for PJOK subjects is 75. The percentage of classical completeness is calculated using the following formula:

$$\text{Classical Completion Percentage (\%)} = (\text{Number of Students Completed [Score} \geq 75] / \text{Total Number of Students}) \times 100\% \text{ (2)}$$

The success criteria for this classroom action research were set at a classical learning completion of at least 85% of the total students in Classes XII-F.6, along with an increase in the average jump distance from Cycle I to Cycle II (H. Irawan et al., 2020). Quantitative data were analyzed using comparative descriptive statistics, while qualitative observational data were analyzed through data reduction, data display, and conclusion making (Kotronoulas et al., 2023).

RESULT

The implementation of long jump learning using multi-level cardboard media was carried out in two consecutive cycles. The results of the study were presented in the form of quantitative data on the performance of the jump distance, the acquisition of skill rubric scores, and the analysis of student learning completeness.

1. Results of Cycle I Implementation

In Cycle I, a multi-level cardboard medium is installed at a height of 15–20 cm from the ground and placed right in front of the rejection area. The exercise is focused on the students' courage to push past the cardboard obstacle.

Tabel 2. Distribution of Student Learning Completeness in Cycle I

Category	Value Range	Number of Students	Percentage
Less	< 75	0	0%
Good	75	10	31%
Tuntas	> 75	22	69%
Total		32	100%

A total of 22 students (69%) achieved the completion criteria above the KKM, while 10 students (31%) remained right at the KKM limit. Reflections on Cycle I show that some students



are still inconsistent in maintaining their initial steps and often change the tempo of running just before rejection. Therefore, corrective actions are designed for Cycle II.

1. Results of Cycle II Implementation

Corrective actions in Cycle II were implemented by applying different heights of multi-tiered cardboard (level 1 = 15 cm, level 2 = 25 cm, level 3 = 35 cm) that were adjusted to the posture and range of the student's jump. In addition, the teacher provided direct explicit feedback and visual markers (check marks) along the approach path.

Tabel 3. Distribution of Student Learning Completeness in Cycle II

Category	Value Range	Number of Students	Percentage
Less	< 75	0	0%
Good	75	0	0%
Tuntas	> 75	32	100%
Total		32	100%

All students in Grades XII-F.6 (100%) successfully exceeded the minimum completeness criteria (KKTP 75). A thorough comparison between the initial conditions, Cycle I, and Cycle II is summarized in Table 4.

Tabel 4. Comparison of Assessment Results Between Cycles

Assessment Indicators	Cycle I	Cycle II	Changes (Δ)	Remarks
Average Jump Distance	2,53 m	2,91 m	+0,38 m	Increase (+15,0%)
Distance Minimum	1,49 m	1,70 m	+0,30 m	Increase
Distance Maksimum	4,30 m	5,10 m	+0,80 m	Increase
Average Skill Score	86,13	96,09	+9,96	Increase
Number of Students Completed	22 Siswa	32 Siswa	+10 Siswa	Increase
Classical Completeness Percentage	69%	100%	+31%	Highly Effective



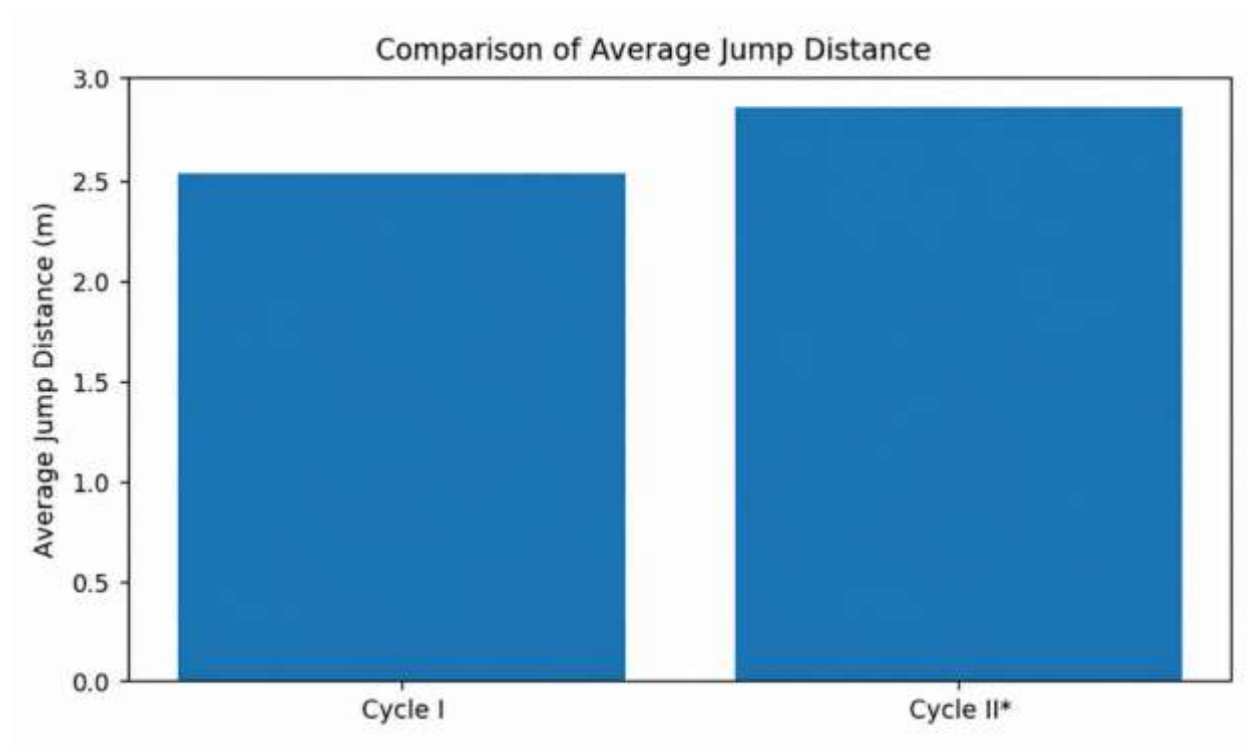


Figure 1. Comparison Graph of Average Student Jump Distance Between Cycle I and Cycle II

DISCUSSION

The main findings of this classroom action research prove that the systematic application of multi-level cardboard media is able to improve basic movement skills of long jump and the active involvement of grade XII students of SMA Negeri 12 Semarang. This increase is evident from the increase in the average class jump distance from 2.53 m in Cycle I to 2.91 m in Cycle II, which is directly proportional to the achievement of full learning completion (100%).

Pedagogically and biomechanically, the improvement of student performance can be explained through the concept of psychomotor impulses and scaffolding (Junaidi et al., 2026). Prior to the intervention of cardboard media, students tended to repulse at a low trajectory angle due to concerns of high jumping or piling errors. The placement of a multi-tiered cardboard right in front of the rejection board acts as a concrete visual obstacle (visual cue) that requires students to push the body upwards to pass the obstacle. As a result, there is an increase in the component of vertical repulsion force (take-off force) and a more optimal drifting angle.

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The use of gradual cardboard levels (media differentiation) has a very positive psychological impact. Students who have low initial movement skills feel less intimidated because they start from obstacles as high as 15 cm. As courage and coordination increase, the obstacles are gradually raised to 35 cm. This is in line with the theory of motor learning from (Simón-Chico et al., 2023) and findings (Aliriad et al., 2024) which states that the modification of obstacle-based learning aids is effective in fostering intrinsic motivation, suppressing fear, and accelerating the automation of basic movements.

The kinetic chain in the long jump also underwent substantial improvements in Cycle II (R. Irawan et al., 2025). By improving the initial rhythm through visual markers and direct correction during exercise, students are able to maintain the speed of acceleration of running to cross the pushboard without unnecessary deceleration. Strong mastery of the thrust then facilitates a more balanced position of hovering in the air, so that both legs can be projected optimally (Wei et al., 2026) (Wei et al., 2026)

The findings of this study reinforce previous studies conducted by (Hasibuan & Sari, 2022) and (Qurtubi et al., 2022) and (Muslim, 2021) which concludes that the modification of simple facilities and media in PJOK is highly effective in boosting athletic learning outcomes without requiring expensive facility costs. This study emphasizes the importance of creativity and reflective acuity of PJOK teachers in designing inclusive, responsive, and flexible tool-based teaching modules in the school environment.

CONCLUSION

Based on the results of the class action research and the discussion that has been described, it can be concluded that the use of multi-tiered cardboard media has proven to be effective in improving the long jump skills of students in grades XII-F.6 of SMA Negeri 12 Semarang. The application of this media is gradually able to optimize the coordination of initial techniques, repulsion strength, hovering balance, and neatness of landing. The improvement in skills is reflected in the increase in the average class jump distance of 0.38 meters (from 2.53 m in Cycle I to 2.91 m in Cycle II, or an increase of 15.0%), as well as a surge in classical learning completeness from 69% to 100%, exceeding the set KKTP.



Based on the above conclusion, some constructive suggestions are presented as follows:

1. For PJOK Teachers: It is recommended to adopt multi-level cardboard media or other simple obstacle modifications as a variation of training in the jumping number athletic material, while still prioritizing safety rules and the principle of differentiation of students' abilities.
2. For Principals & Schools: Should provide support for the development of innovative PJOK learning media and tools based on the use of affordable materials to support the completeness of school infrastructure.
3. For Future Researchers: It is recommended to develop further experimental research on the effect of cardboard height variations on other biometric variables, such as leg muscle explosiveness or specific correlation of repulsion angle.

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