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Traditional Games of Engklek and Gobak Sodor as an Effort to Improve Grade VIII Students' Learning Outcomes in Physical Education at SMPN 15 Surabaya

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Abstract: Learning outcomes in Physical Education, Sports, and Health (PJOK) can be improved through strategies that give every student more opportunities to practice. This collaborative classroom action research (CAR) aimed to improve students' learning outcomes in PJOK through circuit training in Cycle I and the traditional games engklek and gobak sodor in Cycle II. The subjects were 33 Grade VIII-A students at SMP Negeri 15 Surabaya. The study followed the Kemmis and McTaggart model over two cycles, each comprising planning, action, observation, and reflection. Learning outcomes were measured in the knowledge, skills, and attitude aspects, with a mastery threshold of 80. Data were collected through tests, observation, and documentation, and were analyzed descriptively and using normalized gain (N-gain). The mean score rose from 78.3 in Cycle I to 86.2 in Cycle II, and classical mastery increased from 39.4% to 93.9%, with an N-gain of 0.36 (medium). The success indicator (at least 75% of students achieving mastery) was met in Cycle II. Gradually refining circuit training with traditional games can be a low-cost, contextual alternative strategy for PJOK teachers.

Keywords: Circuit Training; Engklek; Gobak Sodor

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INTRODUCTION

Physical activity is a cornerstone of adolescent growth and development, yet young people's activity levels remain a concern (Sidrah Nadira et al., 2026). The World Health Organization (WHO) recommends that children and adolescents engage in moderate- to vigorous-intensity physical activity for an average of 60 minutes per day (World Health Organization (WHO), 2021). However, a cross-national study reported that about 81% of adolescents aged 11–17 years do not meet this recommendation (Salmi & Markuri, 2022). This condition shows that the habit of being active cannot be left entirely to the home and community environment. Schools, through subjects that specifically manage movement, therefore play a strategic role in fostering active habits among students.

This strategic role is carried mainly by the subject of Physical Education, Sports, and Health (PJOK). PJOK instruction aims not only to develop fitness and movement skills but also to build knowledge, sportsmanship, cooperation, and healthy living habits through planned movement experiences (Inggrid Reva Emylya et al., 2026). The extent to which

these goals are achieved is reflected in student learning outcomes, that is, achievements that reflect mastery of knowledge, skills, and attitudes after instruction (Nur Alfiyani & Saliman Saliman, 2024). Therefore, the quality of PJOK instruction cannot be judged by the completeness of planning alone but also by the learning outcomes that students achieve.

In terms of planning and implementation, PJOK instruction at SMPN 15 Surabaya is already going well. Teachers have prepared lesson materials in line with the prevailing curriculum, organized the content coherently, and made use of the available facilities. Students generally take part in lessons in an orderly manner and respect their teachers' instructions. Nevertheless, Grade VIII students' learning outcomes can still be improved, particularly in mastering movement skills that require repetition, because each student's practice time is limited when exercises are performed in turns. This does not mean that the teachers' planning is inadequate; rather, it indicates the need for a strategy that gives every student more opportunities to practice.

This improvement can begin with the structure of instruction. Circuit training offers such a structure because it divides students into several exercise stations that they rotate through within a set time, so that all students move at the same time and gain more opportunities to practice (Achmad Mukhlisin & Andri Suyoko, 2025). This pattern is relevant to the problem in Grade VIII because the more opportunities students have to practice, the greater their chance of mastering movement skills (Achmad Mukhlisin & Andri Suyoko, 2025). However, circuit training is essentially a series of repetitive exercises that emphasize individual work, so it can feel monotonous and leave little room for interaction and the joy of play (Supriadi et al., 2025). Therefore, a structure that is already sound needs to be complemented with more enjoyable and social forms of activity.

Such forms of activity can be found in traditional games, a cultural heritage rich in physical activity as well as social values (Nuryanti et al., 2025). These games use simple rules and easily obtained equipment, making them suitable for the conditions of most schools (Sriyanti & Aulia Singa Zanki, 2023). Engklek trains balance, agility, and coordination because players must hop on one or both feet following a pattern of squares (Oviani et al., 2023). Gobak sodor demands speed, agility in dodging, and team strategy because the guards must block opponents who try to cross the lines (Rohmad Subagio et al., 2024). Both contain fundamental movement elements that align with PJOK content while also requiring intense social interaction.

These advantages can be explained through self-determination theory, which holds that motivation grows when the basic psychological needs for autonomy, competence, and relatedness are met (Siti Badriah & Surawan Surawan, 2025). Intrinsic motivation encourages students to persist in practice, to try again after failing, and ultimately to master skills better (Utami et al., 2024). Traditional games have the potential to satisfy all three needs: students have room to make decisions during play, experience movement success at an attainable level of difficulty, and build a sense of togetherness with their peers (Christoper Butarbutar et al., 2024). When these needs are met, learning feels meaningful and the likelihood of achieving good learning outcomes increases.

A number of studies in Indonesia have reported the benefits of both approaches. Classroom action research with elementary school students showed that circuit exercises improved fundamental movement skills (Hidayat et al., 2020), and a circuit training game model for Grade VIII junior high school students was reported to produce good physical fitness and learning motivation (Marpaung et al., 2025). On the other hand, applying the traditional games gobak sodor and congklak through two-cycle classroom action

research improved the motor skills of Grade III elementary school students (Khumaidah et al., 2025), gobak sodor increased junior high school students' interest in learning physical fitness material (Lisa Firnanda et al., 2026), and gobak sodor within a culturally responsive teaching approach improved senior high school students' PJOK learning outcomes, with mastery rising from 47% in the pre-cycle to 94% in Cycle II (Briliant Pradana et al., 2025). However, these studies examined the two approaches separately. Studies that position circuit training as an initial stage and then refine it with traditional games across a series of action cycles in a classroom where instruction is already going well remain limited. This gap is the basis of the present study.

Based on the above, this classroom action research aimed to improve students' learning outcomes in PJOK through circuit training in Cycle I and the traditional games engklek and gobak sodor in Cycle II in Grade VIII at SMPN 15 Surabaya. Cycle II was refined based on the reflection on Cycle I. The study was considered successful if at least 75% of students achieved mastery with a minimum score of 80 at the end of the cycle (Ami Betriami & Efrizon, 2022). Theoretically, this study enriches research on physical education grounded in local culture by placing learning outcomes at the center. Practically, it offers a gradual strategy that is easy to apply, inexpensive, and contextual for PJOK teachers who wish to refine instruction that is already good.

METHOD

This study was a collaborative classroom action research (CAR) with quantitative and qualitative approaches, aimed at improving students' learning outcomes in PJOK (Presatria, 2026). CAR was chosen because it aims to improve the quality of instruction through systematic reflective action (Ramadhani et al., 2026), in line with the conditions of Grade VIII at SMPN 15 Surabaya, where planning and implementation are already good but learning outcomes can still be improved. The subjects were 33 students (15 boys and 18 girls). The researcher acted as the implementer of the action, while two peer colleagues served as observers. The study was conducted in August–September 2026 in two cycles, and each cycle consisted of two meetings (3 × 40 minutes) covering warm-up, core activities, cooling-down, and closing.

The research procedure followed the Kemmis and McTaggart (1988) model, which consists of planning, action, observation, and reflection. In the planning stage, the researcher and the teacher prepared lesson plans, set up stations, arenas, and equipment, developed the instruments, and divided the students into groups. In the action and observation stage, the action was carried out over two meetings, observers completed observation sheets and documented the activities, and a learning outcome test was administered at the end of the second meeting. In the reflection stage, the researcher, the teacher, and the observers discussed the achievements and shortcomings of the action as the basis for improving the next cycle (Prasojo et al., 2026).

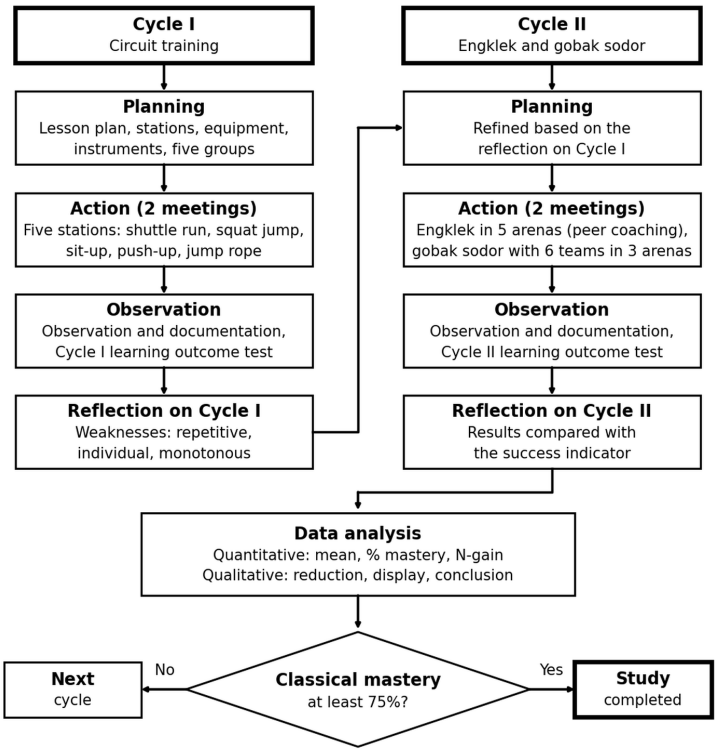


Figure 1. Flow of the classroom action research of the Kemmis and McTaggart (1988) model in implementing circuit training and traditional games

Cycle I applied circuit training so that all students moved at the same time and had more opportunities to practice. Cycle II did not repeat the Cycle I action but replaced it with traditional games based on the reflection on Cycle I, because circuit training tends to be repetitive and individual and thus leaves less room for enjoyment and interaction (Zulham Assidiqqy Handryant et al., 2026). The details of the actions are presented in Table 1.

Table 1. Details of the actions in each cycle

Cycle	Meeting	Core activities
I: Circuit training	1	Introduction to the circuit and the movement at each station. Students were divided into five groups (three groups of 7 students and two groups of 6 students). Five stations: (1) shuttle run, (2) squat jumps, (3) sit-ups, (4) modified push-ups, and (5) jump rope (Dwi Darmawan et al., 2023). Work time was 40 seconds and rest time was 20 seconds, for two rounds.
	2	A three-round circuit with increasing repetition targets, accompanied by movement correction from the teacher. At the end of the meeting, the Cycle I learning outcome test was administered.
II: Traditional games	1	Engklek in five arenas with a fast-turn system; students who were waiting acted as peer assessors (peer coaching). Difficulty was increased gradually (hopping on one foot, hopping on two feet, and hopping while throwing the gaco, or marker stone).
	2	Gobak sodor by six teams (5–6 students) in three arenas simultaneously, with the guard and attacker roles exchanged. At the end of the meeting, the Cycle II learning outcome test was administered.

Learning outcomes were measured in three aspects, with a final score on a scale of 0–100 (Table 2). Final score = (0.3 × knowledge score) + (0.5 × skills score) + (0.2 × attitude score). A student was considered to have achieved mastery if the final score was at least 80, in line with the mastery criterion set by the school (Arifin, 2012).

Table 2. Learning outcome instruments

Aspect	Instrument	Indicators	Scale	Weight	Score (0–100)
Knowledge	Written test, 10 multiple-choice items	1. Basic movement concepts (balance, coordination, agility) 2. Procedures and rules of the activity in the current cycle (circuit training or traditional games) 3. Benefits of physical activity for fitness and health 4. Safety and sportsmanship in sport	0 or 1	30%	Correct answers ÷ 10 × 100
Skills	Performance sheet, 4 indicators	1. Accuracy of movement technique and pattern 2. Balance and movement coordination 3. Agility and reaction speed 4. Fluency and consistency of movement	1–4	50%	Total score ÷ 16 × 100
Attitude	Observation sheet, 4 indicators	1. Sportsmanship (following rules, accepting wins and losses) 2. Cooperation (helping and reminding teammates) 3. Discipline and responsibility (following instructions and turns) 4. Confidence and perseverance (willingness to try, persistence)	1–4	20%	Total score ÷ 16 × 100

The indicators for knowledge, skills, and attitude were developed from the Grade VIII PJOK learning objectives and the objectives of the action in each cycle. The same indicators were used in Cycle I and Cycle II so that the results of the two cycles could be compared. Skills and attitude were scored with a 1–4 rubric using the same criteria for every indicator: a score of 4 was given when the indicator appeared consistently without assistance, 3 when it appeared on most occasions without assistance, 2 when it appeared occasionally or with help from the teacher or peers, and 1 when it did not yet appear. Skills were assessed through student performance on the learning outcome test at the

end of the second meeting of each cycle, whereas attitude was assessed through observation during the lessons.

The quality of the instruments was examined through validity and reliability testing before use (Arifin, 2012). Content validity was examined through the judgment of number experts, namely PJOK lecturer and PJOK teacher, regarding the alignment of the test items, indicators, and rubrics with the learning objectives, the clarity of wording, and their suitability for use. The experts' ratings were analyzed using Aiken's V index (Aiken, 1985). Items or indicators were considered valid when V ≥ threshold, and the results showed V values ranging from lowest value to highest value. Items or indicators that did not meet the criterion were revised according to the experts' feedback.

The reliability of the knowledge test was estimated using the KR-20 coefficient (Kuder & Richardson, 1937) based on a limited tryout with number students outside the research subjects, yielding a coefficient of value, categorized as category. The reliability of the performance sheet and the attitude observation sheet was examined through inter-rater consistency. The researcher and one observer independently scored number students using the same rubric, and the level of agreement was calculated with Cohen's kappa coefficient (Cohen, 1960), yielding κ = value.

Qualitative data were collected through observation sheets of teacher and student activities, field notes, and documentation in the form of photos and videos of the activities (Syifa et al., 2025). The validity of the data was checked through source triangulation, that is, by comparing the test results, observations, and documentation (Vera Nurfajriani et al., 2024), while the skills and attitude assessments were conducted by the researcher and one observer using the same rubric.

Quantitative data were analyzed descriptively using mean scores, classical mastery percentage [(number of students achieving mastery ÷ total number of students) × 100%], and the score distribution in each cycle, and were then compared between Cycle I and Cycle II (Sukardi, 2021). The magnitude of improvement was calculated using N-gain (Hake, 1998), namely (Cycle II mean − Cycle I mean) ÷ (100 − Cycle I mean), with the categories high (≥ 0.70), medium (0.30–0.69), and low (< 0.30). Qualitative data were analyzed through data reduction, data display, and conclusion drawing (Uin & Banjarmasin, 2018). The action was considered successful if at least 75% of students achieved a final score of at least 80 at the end of the cycle (Ami Betriami & Efrizon, 2022). If the indicator was met in Cycle II, the study would be stopped; if not, it would continue to the next cycle based on the reflection results.

RESULT AND DISCUSSION

Result

The study was conducted in two cycles with 33 Grade VIII students at SMPN 15 Surabaya, with a mastery criterion of a final score of at least 80 and a success indicator of at least 75% of students achieving mastery. In Cycle I, the researcher and the teacher prepared the lesson plan, set up five circuit stations (shuttle run, squat jumps, sit-ups, modified push-ups, and jump rope), developed the instruments, and divided the students into five groups. The first meeting was devoted to introducing the circuit and the movements, with two rounds (40 seconds of work and 20 seconds of rest). The second meeting increased the load to three rounds, with movement correction from the teacher, and ended with a learning outcome test. The mean student score in Cycle I was 78.3 (range 72–84), with 13 students (39.4%) achieving mastery, so the target was not met. In terms of process, all students moved at the same time, so waiting time decreased and practice opportunities increased. However, some students appeared bored in the third

round, tended to work on their own, and rarely interacted. Four students still scored below 75 and appeared hesitant on movements that required correction. The reflection concluded that circuit training gave all students a chance to practice, but its repetitive and individual pattern was not enough to drive mastery. The improvements for Cycle II were to add elements of play, teamwork, and varied levels of difficulty, and to support low-scoring students through peer coaching.

Based on this reflection, Cycle II applied engklek to train balance and coordination and gobak sodor to train speed, agility, and teamwork. The arenas were set up in parallel so that all students played at the same time, and the rules of play were explained in advance. The first meeting applied engklek in five arenas with graded levels of difficulty and peer assessors for waiting students. The second meeting applied gobak sodor with six teams in three parallel arenas, with role exchange, and ended with a learning outcome test. The mean student score reached 86.2 (range 79–93), and 31 students (93.9%) achieved mastery, so the target was met. In terms of process, students appeared enthusiastic, dared to try movements, reminded one another within their teams, and practiced longer without appearing bored. Two students scored 79, one point below the mastery threshold, and still lacked confidence in jumping movements and changes of direction. Because the success indicator had been achieved, the study was stopped at Cycle II, and the two students were followed up with mentoring and remedial teaching.

The recapitulation of learning outcomes in both cycles is presented in Table 3 and visualized in Figure 2.

Table 3. Recapitulation of student learning outcomes per cycle

Aspect	Cycle I	Cycle II
Mean score	78.3	86.2
Lowest score	72	79
Highest score	84	93
Students achieving mastery (score ≥ 80)	13	31
Students not achieving mastery	20	2
Mastery percentage	39.4%	93.9%
Target ≥ 75%	Not achieved	Achieved

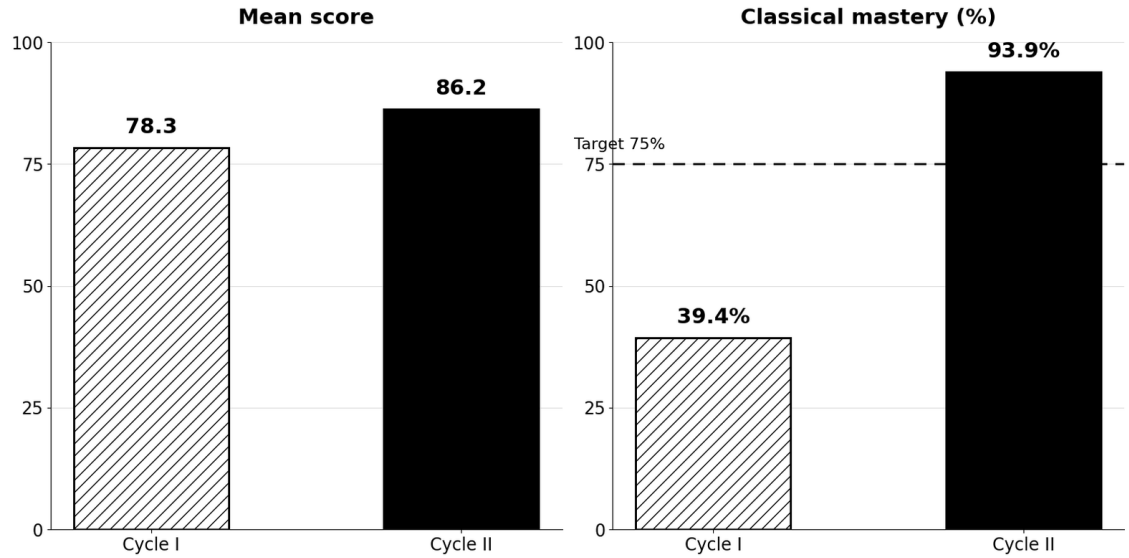


Figure 2. Mean score and mastery percentage of student learning outcomes in Cycle I and Cycle II

The score distribution in Table 4 shows that in Cycle I almost half of the students (16 of 33) were in the 75–79 range, whereas in Cycle II most had shifted to the 85–89 range and six students reached the 90–94 range.

Table 4. Distribution of student learning outcome scores

Score range	Cycle I (number of students)	Cycle II (number of students)
70–74	4	0
75–79	16	2
80–84	13	8
85–89	0	17
90–94	0	6
Total	33	33

From Cycle I to Cycle II, the mean score rose by 7.9 points and the lowest score rose from 72 to 79. The normalized gain was 0.36, which falls in the medium category. The increase in mastery from 39.4% in Cycle I to 93.9% in Cycle II indicates that students' PJOK learning outcomes improved when circuit training was refined with traditional games. The two actions appeared to complement each other: circuit training improved the structure and the number of practice opportunities, while traditional games are presumed to have added motivation, cooperation, and meaning to the movement activities. The Cycle II outcome is also comparable to the study by Briliant Pradana et al., (2025), which reported that PJOK learning mastery reached 94% after gobak sodor was implemented.

In Cycle I, circuit training made all students move at the same time, so waiting time decreased, in line with the aim of the action to address the limited practice time in turn-based exercises. This finding is consistent with earlier studies reporting that circuit exercises improved fundamental movement skills Zadid et al., (2026) and that a circuit training game model produced good learning motivation among junior high school students (Marpaung et al., 2025). Even so, mastery in Cycle I was only 39.4%. The repetitive and individual exercise pattern bored some students, especially those who lacked confidence in movement. This condition became the basis for the reflection that the exercise structure needed to be complemented with more enjoyable and social elements.

In Cycle II, this reflection was put into practice through engklek and gobak sodor. Engklek trains balance and coordination in a playful atmosphere, whereas gobak sodor demands speed, agility, and teamwork and moves all members of a team at the same time. The enjoyable atmosphere and peer support appeared to encourage students to practice longer and to dare to try, which is presumed to have contributed to the improvement in skill mastery. This finding is consistent with studies reporting that gobak sodor improved the motor skills of elementary school students (Khumaidah et al., 2025) and the interest of junior high school students in learning physical fitness material (Lisa Firnanda et al., 2026).

This finding is also in line with self-determination theory, which states that fulfilling the needs for autonomy, competence, and relatedness fosters motivation and learning achievement (Wahyuni et al., 2026). In the games, students had room to make decisions (autonomy), experienced success at an attainable level of difficulty (competence), and felt a sense of togetherness within the team (relatedness). However, these results should be interpreted with caution. Because the same subjects took part in both cycles, the improvement in Cycle II was probably also influenced by practice accumulated since

Cycle I, so it cannot be attributed entirely to the traditional games. This study also did not use a comparison group, so the effect of each action cannot be clearly separated. Even so, the gradual combination of circuit training and traditional games was shown to meet the success indicator and can serve as an alternative strategy for PJOK teachers.

CONCLUSION

This classroom action research shows that the learning outcomes of Grade VIII-A students at SMPN 15 Surabaya in PJOK improved through the implementation of circuit training in Cycle I and the traditional games engklek and gobak sodor in Cycle II. The mean score rose from 78.3 in Cycle I to 86.2 in Cycle II, and classical mastery increased from 39.4% (13 students) to 93.9% (31 students). This improvement is categorized as medium, with a normalized gain of 0.36. The success indicator, namely at least 75% of students achieving mastery with a minimum score of 80, was met in Cycle II, so the study was stopped.

Circuit training gave all students the chance to practice at the same time, but its repetitive and individual pattern meant that mastery was not yet achieved. Traditional games, which added elements of enjoyment, cooperation, and movement variety, appeared to foster enthusiasm and students' willingness to try, so that mastery increased sharply. Gradually refining circuit training with traditional games can therefore be a low-cost, contextual alternative strategy for PJOK teachers to improve learning outcomes in instruction that is already going well. These results should be read with caution because the study had no comparison group and the improvement in Cycle II may also have been influenced by practice accumulated since Cycle I.

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