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# Teaching Elementary Physical Education Under Limited Facilities in Aceh: Teacher Strategies and a Play-Based Method

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**Abstract:**
Limited sports facilities remain a persistent obstacle to Physical Education, Sports, and Health (PJOK) in Indonesian elementary schools. This article combines two complementary studies from Aceh that examine how learning can stay effective under such conditions. Study 1 used a descriptive qualitative design at SD Negeri 6 Syamtalira Aron, North Aceh, to describe how a PJOK teacher overcame limited facilities. Data came from interviews with the teacher, the principal, and students, plus observation and documentation, and were analyzed with the interactive model of Miles, Huberman, and Saldaña and checked through source, technique, and time triangulation. Study 2 was a two-cycle classroom action research at SD Negeri 7 Blang Mangat, Lhokseumawe, with 19 fifth-grade students. It tested a play-based method for relay running through skill and attitude observation, and analyzed mastery percentages against a minimum criterion of 75. Study 1 identified four modification strategies covering tasks and materials, facilities, the learning environment, and evaluation. Facility fulfillment was about 70 percent, and the modifications worked as a buffer and a bridging mechanism after a flood damaged equipment. In Study 2, mastery rose from 47.37% at baseline to 73.68% in Cycle I and 94.74% in Cycle II, exceeding the 75% success indicator, while the mean attitude score rose from 61.25 to 91.25. The findings suggest that teacher adaptation and simple, game-based tasks can sustain PJOK learning where facilities are inadequate. Both studies were small and single-site, so generalization requires caution.

**Keywords: Physical Education; Limited Facilities; Learning Modification; Play-Based Method; Relay Running**

## Introduction

Physical Education, Sports, and Health (PJOK) uses physical activity as its main medium for developing motor skills, fitness, and values such as discipline, cooperation, and sportsmanship (Rahmawati, Nurlia, Oktavia, Ihsani, & Hafiza, 2024). Elementary school children are naturally inclined to move and play, so PJOK lessons work best when pupils practice directly instead of only listening to explanations (Faradila et al., 2024). This practice-based character makes PJOK more dependent on equipment and playing areas than most other subjects.

Many schools cannot provide ideal facilities, and in the two schools studied here the problem took different forms. At SD Negeri 6 Syamtalira Aron, a flood on 24 December 2025 damaged or destroyed part of the sports equipment, and the school has no representative sports field of its own. At SD Negeri 7 Blang Mangat, relay-running lessons were monotonous and supported only by simple facilities and media, and just 9 of 19 fifth-grade students (47.37%) reached the minimum mastery criterion. In both cases the lesson still had to go on, because students' right to learn and to be assessed does not pause when equipment is missing.

Earlier studies in Indonesian schools show a common response to this problem. Teachers at a senior high school in Aceh dealt with equipment shortages by modifying equipment, using the school surroundings as teaching media, and collaborating with the school (Muslina, Amirzan, & Sumarjo, 2025), and PJOK teachers in madrasah ibtidaiyah in Papar showed high creativity, mainly in modifying equipment and adapting their surroundings (Mahmud, Yuliawan, & Prasetya, 2026). A school action research study in Grade V found that low-cost modified equipment raised facility availability, participation, and motivation (Yadi, Sasongko, & Insanistyo, 2026). Play-based and game-based formats have likewise been linked to better running outcomes, including relay running and short-distance sprinting (Aji & Suroto, 2026; Widayana, Zulkarnain, & Hidayat, 2025). Each of these studies looks at one angle: teacher creativity, equipment modification, or a teaching format.

A useful lens is learning modification, which Bahagia et al. (2000) describe as adapting the tasks and materials, the facilities and equipment, the learning environment, and the evaluation so that learning goals can still be reached. In this view, adaptation does not mean lowering the standard; it means reshaping how the goals are pursued. Relay running illustrates the point well. It demands coordination, speed, cooperation, and accurate baton exchange (Tiara, Priambodo, & Marsudianto, 2024), and it can be organized as a game that needs only simple props.

This article therefore reports two studies side by side. The first describes the strategies a PJOK teacher uses to cope with limited facilities. The second tests one concrete instructional response, a play-based method, in a class where learning outcomes were low. Together they address how elementary PJOK can remain effective, safe, and enjoyable when facilities fall short, from the level of a teacher's overall strategy down to the level of a single lesson topic. Unlike the studies above, it places a qualitative account of teacher strategy beside classroom action research evidence of one instructional response, in schools in Aceh.

## Methods

Two studies were conducted in elementary schools in Aceh Province, Indonesia, and are reported together because they approach the same problem from different angles.

Study 1 used a qualitative approach with a descriptive design at SD Negeri 6 Syamtalira Aron, North Aceh. Data collection ran from June to August 2026, and the interview and observations reported here took place on 4, 8, and 24 August 2026. Informants were chosen by purposive sampling: the PJOK teacher was the key informant, and the principal and upper-grade students were supporting informants. Data came from semi-structured interviews, direct observation of facilities and lessons, and documentation (teaching modules, equipment inventory, school profile, and photographs). The researcher acted as the main instrument, guided by interview, observation, and documentation protocols. The interview grid covered four dimensions of modification: tasks and materials, facilities and equipment, learning environment, and evaluation (Bahagia et al., 2000). Analysis followed the interactive model of Miles, Huberman, and Saldaña (2014): data collection, data reduction, data display, and conclusion drawing and verification. Credibility was checked through source, technique, and time triangulation (Hariawan, Haromain, Rohiyatun, Najwa, & Suhardi, 2025; Sugiyono, 2022).

Study 2 was classroom action research at SD Negeri 7 Blang Mangat, Lhokseumawe, from 28 August to 11 September 2026. It had two cycles of two meetings each (2 × 35 minutes per meeting), and every cycle included planning, action, observation, and reflection. Participants were all 19 fifth-grade students (9 boys and 10 girls), selected by total sampling. The action was a play-based method: team relay games using simple or modified batons, cones, and a whistle, built around running in turns, passing and receiving the baton, speed, and cooperation. The researcher and a collaborating teacher recorded data with two observation sheets. The skill sheet scored the start, the running movement, and the finish on a four-point rubric (maximum 12). The attitude sheet scored active participation, earnestness, cooperation, and self-confidence on a four-point rubric (maximum 16). The final score was 70% skill plus 30% attitude, and a score of at least 75, the minimum mastery criterion, counted as mastery. Data were analyzed descriptively using percentages: mastery (%) = students who mastered ÷ all students × 100. The action would be judged successful if more than 75% of students mastered the material and attitude scores rose from cycle to cycle.

## Results and Discussion

### Findings

### Study 1: Teacher strategies under limited facilities

Interviews, observations, and documents converged on four strategies, summarized in Table 1.

Table 1. Modification Strategies Used by the PJOK Teacher

| Dimension | Main strategy | Examples |
|---|---|---|
| Tasks and materials | Efficient class organization through group or station rotation, without changing the learning outcomes | Station A uses equipment while station B trains physical strength; turn-taking keeps waiting time productive |
| Facilities and equipment | Substitute equipment made from simple materials | Used tires for jumping, cardboard as a basket, class tables as tunnels, garden benches for balance, rope as a volleyball net |
| Learning environment | Space engineering at school and a partnership for an outside field | Yard divided into four stations; cones or bottles as boundaries; a nearby company field used under right-to-use status |
| Evaluation | Shift from final product to movement process and coordination | One analytic rubric for all students; modified equipment of equal difficulty |

Source: Interviews, observations, and documents, 2026

*Tasks and materials.* The teacher adjusted the lesson plan to organize the class efficiently without changing the learning outcomes of the Merdeka Curriculum. With a station system, one group worked with equipment while another did physical conditioning, so queuing for equipment became a minor bottleneck rather than lost time. The teacher said limited facilities did not reduce students' enthusiasm, and that big-ball games such as basketball were the hardest to teach because equipment and movement variety were limited.

*Facilities and equipment.* The flood of 24 December 2025 damaged or destroyed items such as basketballs, the volleyball net, portable basketball hoops, mini futsal goals, batons, cones, and jump ropes, while footballs, mini volleyballs, badminton sets, and gymnastics mats stayed in good condition. The teacher replaced lost items with the substitutes in Table 1 and made them alone, without involving students, to save lesson time. The principal explained that equipment purchases depend on school operational grants (BOS) that have no share reserved for PJOK and are released quarterly. The teacher named three barriers: modified equipment wears out quickly under heavy use, its upkeep is often paid from the teacher's own money, and paper or cardboard falls apart after rain.

*Learning environment.* Because the school has no representative field, the teacher used small-sided games in the school yard, divided it into four stations with equipment in the middle, and marked class areas with cones or bottles. For topics that need wide space, lessons moved to a nearby field owned by a local company and used under a right-to-use arrangement, with permission from the principal and community leaders. In an observed volleyball lesson on 24 August 2026, a rope replaced the net and chalk marked the court. Students were active and enthusiastic, and small groups sped up turn-taking.

*Evaluation.* Assessment shifted from final results with standard equipment to movement process and coordination. The teacher kept scoring fair with an analytic rubric that used the same movement descriptors for every student and with modified equipment of equal difficulty.

The principal put equipment fulfillment at about 70%, with no official complaint that sports achievement had suffered. He regarded modified equipment as a short-term solution because of limits in safety, quality, and durability, and expected standard equipment to be bought step by step. The teacher described official procurement as taking one to three weeks, and during that wait modification served as a bridge.

**Study 2: Play-based method in relay running**

At baseline, 9 of 19 students (47.37%) met the criterion, and lessons were monotonous, with some students inactive, unenthusiastic, or bored. Table 2 shows the change across the two cycles.

Table 2. Relay-Running Learning Mastery at Baseline, Cycle I, and Cycle II

| Stage | Students | Mastered | Not yet | Mastery (%) | Status |
|---|---|---|---|---|---|
| Baseline | 19 | 9 | 10 | 47.37 | Not achieved |
| Cycle I | 19 | 14 | 5 | 73.68 | Not achieved |
| Cycle II | 19 | 18 | 1 | 94.74 | Achieved |

Source: Classroom action research data, 2026

After Cycle I, mastery reached 73.68% (14 students), a gain of 26.31 percentage points that still fell just below the 75% indicator. Reflection showed that game rules should be simpler, baton passing needed more attention, the five students who had not yet mastered the material needed more intensive guidance, group composition had to be more even, and students needed more practice. These points shaped Cycle II, in which 18 of 19 students (94.74%) mastered the material. That is a further gain of 21.06 points and a total gain of 47.37 points, above the indicator, so the action hypothesis was accepted and the research stopped after Cycle II.

Table 3. Student Attitude Scores by Aspect

| Aspect | Baseline | Cycle I | Cycle II |
|---|---|---|---|
| Active participation | 50 | 70 | 90 |
| Earnestness | 60 | 80 | 90 |
| Cooperation | 65 | 75 | 95 |
| Self-confidence | 70 | 75 | 90 |
| **Mean** | **61.25** | **75.00** | **91.25** |

Source: Classroom action research data, 2026

Attitude improved in every aspect (Table 3), and the mean rose from 61.25 to 75.00 and then 91.25. Active participation gained the most (40 points) after being the weakest aspect in Cycle I (70), while earnestness and cooperation each gained 30 points.

**Analysis**

The four strategies in Study 1 match the four dimensions of learning modification in the framework (Bahagia et al., 2000), and the teacher used them together rather than one at a time. Station rotation protected active learning time, substitute equipment filled the gaps left by the flood, the marked yard and the borrowed field supplied space, and process-based scoring kept assessment fair when equipment was not standard. The

strategies also agree with studies in which limited facilities pushed teachers to modify equipment and use their surroundings (Mahmud et al., 2026; Muslina et al., 2025), and with action research showing that low-cost modified equipment raised participation and motivation (Yadi et al., 2026). Assessing process fits PJOK practice under the Merdeka Curriculum, which uses reflective assessment of attitudes, knowledge, and skills (Muhadi, Muhammad, & Kogoya, 2023).

An important nuance is that the limitation was partial, not total. Facility fulfillment was about 70%, much of the shortage dated from a single flood, and the field problem was eased by a partnership. A survey of Merdeka Curriculum PJOK implementation in a vocational school likewise rated facilities lower (71.88%) than planning, implementation, assessment, and character development (Sari & Faruk, 2026), so a facility gap alongside otherwise sound practice is not unique to this school. Modification therefore acted mostly as a buffer that absorbed the shock and as a bridge while official procurement ran, not as a permanent way of surviving scarcity. The principal's reservations about safety and durability, and the teacher's out-of-pocket costs, show that the bridge has a price: it rests on the teacher's initiative and personal money. The decision to keep students out of equipment making saved lesson time but forgoes a chance to build cooperation and creativity, so a limited student role could be considered.

In Study 2, mastery and attitude rose together, and the pattern across cycles shows how the action improved through reflection. Cycle I produced a large gain but missed the indicator, and simpler rules, clearer demonstrations, targeted coaching on baton exchange, and more even groups then closed the gap. Play lets students repeat the start, the run, and the finish many times in an enjoyable setting, so skill practice does not feel like drill. This is consistent with reports that game-based and traditional-game activities raise student motivation in PJOK (Faradila et al., 2024), and with the view that relay running trains cooperation along with speed and coordination (Tiara et al., 2024). The large gains in cooperation (65 to 95) and active participation (50 to 90) suggest that group games gave every student a role, so no one was only a spectator. Comparable gains appear in other studies without control groups: relay-running mastery rose from 40% to 75% with a team-games method (Widayana et al., 2025), mastery of a volleyball skill rose from 29.41% to 88.24% with modified rubber balls (Wirayuda & Harahap, 2026), and sprint scores rose after a play-based treatment (Aji & Suroto, 2026).

Read together, the two studies point to a shared mechanism. Both keep students physically active and engaged by changing how the lesson is organized instead of waiting for ideal equipment, and the relay lessons themselves relied on simple or modified batons and cones, the kind of low-cost substitution documented in Study 1. The teacher-level strategies of Study 1 and the play-based method of Study 2 can therefore be read as complementary, although the two schools differ and the link is an interpretation, not a tested relationship.

Several limits apply. Each study covers a single school, so the findings may not transfer elsewhere. Study 1 rests mainly on interviews with one teacher and one principal, so the effectiveness of modification is judged from their reports, backed by observation and documents, and not from student outcome data. Study 2 had 19 students and no control group, so the gains cannot be credited to the play-based method alone and may include practice effects. Future work could compare several schools, measure student outcomes under modified equipment directly, and test the play-based approach against a comparison group.

## Conclusion

Under limited facilities, elementary PJOK can remain effective, safe, and enjoyable when teachers adapt in a systematic way. In North Aceh, the teacher modified tasks and materials through station rotation, replaced damaged equipment with simple substitutes, reorganized space and used a nearby field, and shifted assessment from product to process. With equipment fulfillment at about 70%, these modifications worked as a buffer and a bridge while official procurement continued, although their durability, safety, and cost remain concerns. In Lhokseumawe, a play-based method accompanied a rise in relay-running mastery from 47.37% to 73.68% and then 94.74% across two cycles, and a rise in mean attitude score from 61.25 to 91.25.

For practice, teachers can combine station organization, low-cost substitutes, and game-based tasks. Schools and education offices should budget for durable equipment and shorten procurement time so that teachers' own money does not carry the cost. Future studies should include several schools and comparison groups and should measure student outcomes directly.

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