

## Introducing Motor Games to Improve Physical Health and Coordination in Elementary School Students

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### Abstract

Sedentary lifestyles and conventional physical education limit the motor development of primary school children. This community service program aimed to improve the physical health and movement coordination of pupils at MI ICP Nurul Ulum Bojonegoro through the introduction of creative, enjoyable, and educational motor games. The program applied a participatory and educational approach across five stages, namely socialization, teacher training, technology and innovation adoption, mentoring and evaluation, and program sustainability. The core innovation was the Interactive Motor Learning Innovation Package (PIMI), which combines simple physical equipment with QR code video tutorials and a Merdeka Curriculum based motor game module. Up to the midpoint of implementation, the team completed initial coordination, socialization and the formation of a healthy school team, teacher training, module preparation, equipment procurement, and most field mentoring. Preliminary results show high student enthusiasm, improved teacher capacity in designing motor activities, and the emergence of more varied physical activity habits. The program demonstrates that an accessible and low-cost technology can be absorbed independently by partner teachers and holds strong potential to be replicated as a model of a healthy, game-based school in Bojonegoro.

**Keywords:** community service; coordination; elementary school; motor games; physical health

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### INTRODUCTION

Physical education and the development of motor skills in primary school children form an important part of character building, physical health, and learning readiness. Well-directed physical activity affects not only physical endurance but also supports better concentration, cooperation, and emotional balance in children. A range of studies confirms that well-managed physical education plays a direct role in developing children's gross motor skills while also serving as a foundation for their cognitive and social growth (Purwanto & Baan, 2022). Adequate physical activity is also closely related to pupils' motor skills and physical fitness, so a decline in physical activity tends to lower the quality of their movement and fitness as well (Yoga et al., 2023). Unfortunately, in the digital era children tend to spend more time in passive activities at home, such as watching television or playing with gadgets, which reduces the stimulation of their motor skills and body coordination.

Physical learning built on play is one of the most widely recommended solutions. Packaging movement content as attractive games has been shown to raise learning motivation alongside pupils' movement skills, while developing movement modules based on game modification answers teachers' need for structured guidance that is easy to apply. An outdoor activity approach likewise provides richer sensory stimulation and involves more active body movement than indoor activity (Aliriad et al., 2023; Aliriad et al., 2024; Salman & Darsi, 2020). MI ICP Nurul Ulum is an integrated Islamic primary school located in an urban area with reasonably adequate learning facilities. Based on initial observation and interviews with the physical education teacher and the head of the madrasah, it was found that although the school has a good environment and learning facilities, students' physical activity remains suboptimal and tends to be monotonous. Sports learning focuses mostly on calisthenics and basic drills without attractive and challenging variations of motor games.

From the initial identification, the partner's problems converged on four interrelated issues. First, the lack of variety in physical activity and motor games, so students quickly become bored. Second, the absence of a structured module or guide for motor games, so teachers still rely on personal experience. Third, insufficient stimulation of fine and gross motor coordination, evident from some students who struggle with movements requiring balance and eye and hand coordination. Fourth, the dominance of passive activity outside school, where most students spend more time on digital activity than on physical activity. This context aligns with findings from a similar activity in the ICP Nurul Ulum environment, which showed that enriching movement experience strengthens children's motor skills (Aliriad et al., 2024).

Several recent studies reinforce the proposed direction. The application of circuit games combined with auditory sequencing was able to improve primary school children's basic motor skills, and the Teaching Games for Understanding model through modified traditional games proved effective in stimulating student movement (Aliriad et al., 2025; Gustian et al., 2024). Environment based approaches and motor development models also showed positive results for children with special needs, while project based learning was shown to strengthen the fundamental motor skills of young children (Satira et al., 2023; Aliriad et al., 2023). Even so, most of these studies focus on testing the effectiveness of movement models, and few combine simple play equipment with digital guidance that teachers can operate independently in the madrasah.

This is where the novelty of the program lies. The team did not merely introduce motor games but developed the Interactive Motor Learning Innovation Package, abbreviated PIMI, a set of simple motor game equipment accompanied by video guidance through QR codes and a Merdeka Curriculum based module. The innovation offered is therefore low cost, easy to replicate, and designed to keep running without continuous dependence on the team's physical presence. Building on this rationale, the program aimed to improve the physical health and movement coordination of pupils at MI ICP Nurul Ulum through the introduction of creative, enjoyable, and educational motor games. This aim was broken down into five targets, namely training teachers in innovative motor game models, compiling a module of activities applicable in physical learning, improving students' fitness and motor coordination through structured activities, encouraging active participation of parents, and fostering a culture of healthy and active living in the school and family environment. This article reports the progress of implementation up to the midpoint of the program, beginning with the contract signing in January 2026.

## METHOD

The program was carried out at MI ICP Nurul Ulum, Jalan Ahmad Yani Number 10 Sukorejo, Bojonegoro, East Java, targeting students in grades 1 to 6 together with the physical education teacher and class teachers. The approach used was participatory and educational, positioning teachers and students as subjects of the activity rather than mere beneficiaries. All solutions were adapted to the partner's real conditions and designed to be integrated into the school system. Data were collected through field surveys, interviews with the head of the madrasah and teachers, classroom observation, questionnaires, and activity documentation. The evaluation of students' motor development used simple instruments in the form of balance, agility, and eye and hand coordination tests, measured as baseline data before the program ran fully, to be later compared with the final results. Analysis was conducted descriptively in both qualitative and quantitative ways to describe the achievement of each stage. Operationally, the implementation method is set out in the following five stages.

The first stage is socialization, namely building an understanding among the school and the community about the importance of introducing motor games through meetings with the head of the madrasah, teachers, and parents, presentation of the team's preliminary study, and participatory discussion. The output of this stage is a shared commitment and an agreement on program implementation. The second stage is training, which becomes the core activity for improving teacher competence in creating game based physical learning. This stage covers theoretical sessions on children's motor development, field practice or micro teaching, and reflection and module preparation, with outputs in the form of a learning module, competent teachers, and instructional videos.

The third stage is technology and innovation adoption, namely the use of simple learning technology that combines physical games with digital media. The steps include applying support tools such as ropes, cones, and plastic balls, producing digital guidance in the form of QR code video tutorials for each game, and integrating motor activities with learning themes. Mentoring models based on interactive games of this kind have shown a positive impact on raising participant enthusiasm across various community service activities. The fourth stage is mentoring and evaluation, carried out

during and after the training with a focus on direct field application, covering observation, evaluation of students' motor development, feedback to teachers, and the collection of quantitative and qualitative data (Sari et al., 2025). The fifth stage is program sustainability, which ensures the activity does not stop after the service ends through the scheduling of routine activities, the formation of Healthy Movement Ambassadors from among the students, the production of documentation videos, and remote online mentoring.

## RESULTS AND DISCUSSION

Up to the midpoint of implementation, most stages of the activity have proceeded as planned. This section describes the achievement of each stage together with the results obtained in the field, then places them in the context of previous research. Before discussing each stage, the partner profile is presented to give an overview of the school's existing condition.

**Table 1.** Profile of the Partner MI ICP Nurul Ulum

| Aspect                         | Description                                                               |
|--------------------------------|---------------------------------------------------------------------------|
| School status                  | Integrated Islamic Primary School (private)                               |
| Number of students             | 230 students (grades 1 to 6)                                              |
| Number of teachers             | 18 persons (1 physical education teacher)                                 |
| Location                       | Strategic urban area, easily accessible                                   |
| Facilities                     | Multipurpose field, modern classrooms, play area, mini laboratory         |
| Parents' socio-economic status | Middle to upper (professionals, civil servants, entrepreneurs, academics) |
| Community support              | High, actively involved in school activities                              |

The preparation and initial coordination stage has been completed. The team coordinated with the head of the madrasah and teachers to determine the schedule, equipment needs, and the form of activities agreed upon together, followed by a field survey to assess the physical condition of the school, the potential of play areas, and supporting facilities. This coordination produced an activity plan, a division of team tasks, and an implementation schedule agreed upon by both parties. The socialization stage has also been completed. The team conveyed the objectives, benefits, and activity plans to all teachers, student representatives, and parents in an open atmosphere, so that a shared perception emerged regarding the importance of motor games for children's health and learning. At this stage a Healthy School Team was formed, consisting of representatives of teachers, students, and the school committee, to support the activity while safeguarding its sustainability. Forming such an internal team is important because program sustainability depends greatly on the partner's ownership of the activity rather than merely on the presence of the service team.

Teacher training has been conducted through a workshop and practice approach. Teachers received material on children's motor development, the principles of modern physical education, and strategies for integrating motor games into learning. In the practice session, teachers directly tried various games such as relays, ball catching, coordination nets, and rhythmic games. This hands-on experience aligns with the finding that attractively packaged games can raise both motivation and movement skills, so that teachers not only understand the concept but also feel for themselves the effect of games on participant engagement.

The preparation of the Merdeka Curriculum based motor game module was carried out collaboratively with teachers and has entered the refinement stage. Providing a structured module answers one of the partner's main problems, namely the absence of a standard guide that previously left teachers dependent on personal experience. Early results show that most teachers are already able to design simple motor game activities independently. This achievement also aligns with higher education support for Merdeka Curriculum implementation, which emphasizes strengthening teacher capacity as a key to success (Siska et al., 2023). The procurement of motor game equipment in the form of colorful cones, obstacle ropes, balance boards, plastic balls, and foam mats has been completed. Each tool is fitted with a QR code label linked to a usage guide video. The production of tutorial videos for each game is ongoing and some can already be scanned and used by teachers independently, while the application of interactive motor games is beginning to be integrated into physical education lessons. The main product developed is the Interactive Motor Learning Innovation Package (PIMI), a

combination of physical components with digital media. The physical components include cones as track markers, elastic obstacle ropes for jumping practice, a mini balance board, light plastic balls for eye and hand coordination, and a folding foam mat. The digital components consist of QR code video tutorials lasting two to three minutes for each game and a digital module in interactive PDF format containing equipment descriptions, how to play, and the character values being developed. The component specifications are presented in Table 2.

**Table 2.** Specifications and Dimensions of PIMI Components

| Component      | Material         | Size            | Specification         | Capacity            |
|----------------|------------------|-----------------|-----------------------|---------------------|
| Colorful cones | Flexible plastic | 23 x 14 cm      | Bright colors (6 pcs) | 20 students/session |
| Obstacle rope  | Elastic rubber   | 2 m             | Adjustable height     | 15–20 students      |
| Balance board  | Light wood       | 100 x 20 x 2 cm | Load capacity 60 kg   | 10 students/session |
| Plastic ball   | Light PVC        | Diameter 15 cm  | Child safe            | 30 students         |
| Foam mat       | EVA foam         | 180 x 60 cm     | Non-slip, light       | 10 students         |

The choice of simple tools combined with digital guidance is not without basis. Well-designed circuit games and tool modification have been shown to improve primary school children's basic motor skills and the use of interactive media in community service has been shown to keep participant enthusiasm high. The advantage of PIMI lies in its ease of replication, since teachers simply scan a QR code to obtain uniform guidance without the need for continuous face to face mentoring. Field mentoring is ongoing and has gone through several meetings. The team observed student participation, teacher engagement, and the effectiveness of the games, then provided feedback for improvement. An initial evaluation of students' motor ability was carried out through balance, agility, and eye and hand coordination tests as baseline data before the program ran fully. Student enthusiasm appeared high, especially in games involving groups and an element of healthy competition. This pattern aligns with the finding that game based approaches, including the Teaching Games for Understanding model, are effective in stimulating movement and student engagement. A recapitulation of the achievement of all activity stages up to the mid point of implementation is presented in Table 3. The table shows that the early stages have been completed, while implementation, evaluation, and reporting are still ongoing according to schedule.

**Table 3.** Recapitulation of Activity Stage Achievements

| Activity Stage                                         | Achievement Status  |
|--------------------------------------------------------|---------------------|
| Coordination and initial survey                        | Completed 100%      |
| Socialization and formation of the Healthy School Team | Completed 100%      |
| Teacher training and module preparation                | Nearly complete 90% |
| Implementation and field mentoring                     | Ongoing 65%         |
| Evaluation and reflection                              | Early stage 30%     |
| Sustainability and reporting                           | Not yet 10%         |
| Drafting and submitting the journal article            | Not yet 0%          |

Output achievements up to the midpoint of implementation are set out in Table 4. Some outputs have already materialized as products and documentation, while publication outputs are still in progress. The appropriate technology output has been achieved through the procurement of motor game equipment fitted with QR codes, while the module and tutorial videos are largely complete.

**Table 4.** Achievement of Mandatory Outputs

| Type of Output                                               | Target                                 | Status      |
|--------------------------------------------------------------|----------------------------------------|-------------|
| Improvement of partner skills in the social-community aspect | Students' motor development improves   | In process  |
| Improvement of basic movement management in learning         | Basic movement management strengthened | In process  |
| Sinta 4 accredited national journal (Jurnal Panjar)          | Published                              | Drafting    |
| News coverage in electronic mass media (Aula News)           | Uploaded                               | In process  |
| Audiovisual work in the form of activity video (YouTube)     | Uploaded                               | In process  |
| Copyright (HKI) for the activity poster                      | Registered                             | Preparation |
| Appropriate technology (sports tools with QR code)           | Fulfilled                              | Achieved    |

The impact that has begun to appear includes greater variety in physical learning activities, growing student enthusiasm and participation, and increased teacher confidence in managing game based learning. For students, the activity stimulates gross and fine motor coordination and shapes character traits of discipline, cooperation, and responsibility. Strengthening such coordination matters because fine and gross motor skills develop through diverse and repeated stimulation (Yulia, 2024). A rich movement experience, including through traditional and modified games, is consistently reported to drive children's motor development (Sutini, 2018).

For the school, PIMI has the potential to become a pilot project for a healthy school based on educational games that can be replicated by other madrasahs in Bojonegoro. This finding reinforces earlier studies showing that traditional Banten games and the like are effective in improving children's gross motor skills (Alawiyah, 2014) while adding a new contribution, namely the integration of digital guidance that makes such good practice easier for teachers to sustain independently. In other words, the activity does not stop at testing the effectiveness of a movement model but ensures the innovation is genuinely absorbed and practiced by the partner. Several notes for improvement nonetheless emerged during implementation. Motor development among students is not yet even, and some female students appeared less active than male students, so the design of games in the next stage needs to be more inclusive. In addition, a final fitness evaluation through a post-test must still be completed to obtain measurable improvement data. These matters become the focus of the plan for the next stages.

## CONCLUSION

The implementation of the community service program at MI ICP Nurul Ulum up to the midpoint has proceeded as planned. The stages of coordination, socialization, teacher training, module preparation, equipment procurement, and most of the implementation mentoring have been carried out well. Student enthusiasm is high, teachers' ability to design motor activities has improved, and the PIMI technology is beginning to be applied independently by the partner. This achievement shows that the chosen participatory approach is effective in addressing problems in both education and children's health. To make the results more optimal and sustainable, the school is advised to integrate motor games into the physical education schedule permanently, continue the Fun Motoric Games extracurricular program, and involve parents continuously in supporting children's physical activity at home. Fitness evaluation should be carried out regularly each semester so that students' motor development can be monitored continuously. The next stages focus on completing the final fitness evaluation, strengthening sustainability, and finalizing the mandatory outputs in the form of journal publication, activity video, media coverage, and poster copyright registration.

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## DECLARATION OF CONFLICTING INTERESTS

The authors states that there is no conflict of interest in the publication of this article.

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