Journal of Comunity Service in Early Childhood Education

Vol. 2 No. 1, 2026: pp. 257-272
E-ISSN 3109-2411
https://journal.bestscholar.id/jcosece

Play-Based Community Service Program to Develop Early Childhood Motor Skills

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DOI: 10.64840/jcosece.v2i1.119

Article Info

Received:
05-10-2025
Revised:
25-12-2025
Accepted:
12-03-2026
Published:
28-04-2026

Keywords:
Early Childhood,
Motor Development,
Participatory Action Research,
Play-Based Learning,
Community Service

Abstract

Background: Early childhood motor development is a fundamental aspect that supports children's physical growth, coordination, and readiness for learning. However, limited stimulation through structured and engaging activities often results in suboptimal motor skill development in early childhood education settings, particularly in community-based environments.

Aims: This community service program aims to improve early childhood motor skills through the implementation of play-based learning activities that are engaging, participatory, and developmentally appropriate.

Methods: This program employed a Participatory Action Research (PAR) approach involving collaboration between lecturers, teachers, and children. The participants consisted of early childhood learners aged 4–6 years in a community-based educational setting. The intervention was conducted through structured play activities such as movement games, outdoor play, and guided physical exercises designed to stimulate gross motor skills. Data were collected through observation and documentation and analyzed descriptively across implementation stages.

Results: The implementation of play-based activities showed a significant improvement in children's motor skills, including balance, coordination, and body movement control. Children demonstrated higher participation, enthusiasm, and confidence during physical activities. In addition, teachers showed increased ability in designing and implementing interactive play-based learning strategies.

Conclusion: The play-based community service program effectively enhanced early childhood motor development and strengthened teachers' pedagogical capacity. The findings indicate that simple, contextual, and engaging play activities can provide meaningful stimulation for children's physical development and can be sustainably implemented in early childhood education settings.

How to Cite
Fitriani, D., Juwita, R. P., Arista, & Ismail, M. B. (2026). Play-Based Community Service Program to Develop Early Childhood Motor Skills. *Journal of Comunity Service in Early Childhood Education*, *2*(1), 257–272. https://doi.org/10.64840/jcosece.v2i1.119

Publisher
CV Berkah Syandin Trust (CV BEST)

INTRODUCTION

Early childhood represents a critical period for holistic development, encompassing physical, cognitive, social, and emotional domains. Among these domains, motor development particularly gross motor skills plays a fundamental role in supporting children's overall growth and learning readiness. Gross motor skills involve coordination, balance, strength, and body control, which are essential for daily functioning and participation in learning activities. Recent studies highlight that early motor competence is strongly associated with later academic achievement, executive function, and physical health outcomes (Logan et al., 2021; Robinson et al., 2020; Barnett et al., 2022). Furthermore, adequate motor stimulation during early childhood has been shown to enhance neural development and support children's engagement in active learning environments (Adolph & Hoch, 2021; Garcia et al., 2023). Therefore, providing appropriate motor stimulation through meaningful activities is essential in early childhood education.

However, in many early childhood education settings, particularly in community-based and rural environments, motor development stimulation is often not optimally implemented. Learning practices tend to prioritize early literacy and numeracy skills, while physical and play-based activities receive less attention. This imbalance results in limited opportunities for children to develop essential motor competencies through active engagement. Empirical evidence suggests that insufficient physical activity and lack of structured play can lead to delays in motor development and reduced physical fitness among young children (Carson et al., 2021; Draper et al., 2022; Jones et al., 2020). In addition, constraints such as limited facilities, lack of teacher training, and minimal access to innovative learning strategies further exacerbate the problem (Hardy et al., 2022; Palmer et al., 2021). These conditions indicate a significant gap between recommended developmental practices and actual implementation in the field.

Play-based learning has been widely recognized as an effective approach to support early childhood development, including motor skills. Through play, children actively explore, experiment, and interact with their environment, allowing them to develop coordination, balance, and movement control in a natural and enjoyable manner. Research shows that structured and guided play activities can significantly improve children's gross motor skills, physical activity levels, and overall well-being (Tremblay et al., 2021; Zeng et al., 2021; Wick et al., 2020). Moreover, play-based approaches have been found to increase children's motivation, participation, and engagement in learning processes (Pyle et al., 2022; Weisberg et al., 2023). These findings suggest that integrating play into learning activities is not only developmentally appropriate but also pedagogically effective in early childhood education.

Several previous community service and educational intervention programs have attempted to improve early childhood development through physical activities and teacher training. Studies indicate that community-based interventions can

DOI: 10.64840/jcosece.v2i1.119

enhance children's motor competence and promote active lifestyles when implemented collaboratively with teachers and stakeholders (Okely et al., 2021; Hnatiuk et al., 2022). In addition, training programs that equip teachers with practical strategies for implementing play-based learning have been shown to improve instructional quality and learning outcomes (Fukkink & Lont, 2020; Egert et al., 2020). However, many of these programs still adopt general approaches and lack contextual adaptation to specific community needs, particularly in resource-limited settings. As a result, their sustainability and long-term impact remain limited (Bakken et al., 2021; Yoshikawa et al., 2020).

Furthermore, previous studies often focus on institutional or curriculum-level interventions without emphasizing direct, hands-on engagement between educators and children through structured play activities. The lack of iterative implementation processes, such as reflection and adaptation, also limits the effectiveness of such programs (Kemmis et al., 2022; Bray et al., 2020). In addition, many interventions rely on standardized or resource-intensive materials that are not easily accessible in community-based settings. This creates a gap between theoretical recommendations and practical implementation in the field (Putri et al., 2020; Rahman et al., 2022). Therefore, there is a need for a more contextual, participatory, and sustainable approach that integrates simple, engaging, and developmentally appropriate activities.

Responding to these gaps, this community service program introduces a play-based intervention designed to enhance early childhood motor skills through structured and engaging activities. The program adopts a Participatory Action Research (PAR) approach, emphasizing collaboration between educators and practitioners in designing, implementing, and evaluating learning activities. The novelty of this program lies in its integration of play-based motor stimulation, community involvement, and the use of simple and contextually relevant activities that can be sustainably implemented in limited-resource environments. This approach ensures that the intervention is not only effective but also adaptable and replicable in similar contexts.

Therefore, this community service program aims to improve early childhood motor skills through play-based learning activities while strengthening teachers' capacity in implementing interactive and developmentally appropriate learning strategies. By addressing the gap between theoretical recommendations and practical implementation, this program is expected to contribute to the development of more inclusive, engaging, and sustainable early childhood education practices.

METHODS

Community Service Design

This community service program employed a Participatory Action Research (PAR) approach, which emphasizes a collaborative, cyclical, and reflective process involving lecturers, students, teachers, and the community. This approach was selected to address real challenges in early childhood education through direct intervention and continuous improvement. PAR integrates action and reflection, allowing the program to be adaptive, participatory, and sustainable. The program was implemented by the Early Childhood Islamic Education Study Program (PIAUD), UIN Ar-Raniry Banda Aceh, as part of the Community Service Program (KPM-DRI). The implementation involved active collaboration between academic institutions and educational practitioners to ensure the relevance and effectiveness of the intervention.

Participants and Setting

This program was conducted at Hafidzul Ilmi Kindergarten, located in Desa Blang Krueng, Kecamatan Darussalam, Banda Aceh, Indonesia. The implementation was carried out through collaboration between the PIAUD Study Program, UIN Ar-Raniry Banda Aceh, and Hafidzul Ilmi Kindergarten as a partner institution. The program took place during the odd semester of the 2025–2026 academic year (September–October 2025) over a period of 40 days. This duration allowed sufficient time for planning, implementation, observation, and reflection within the PAR framework.

The participants consisted of children aged 4–6 years as the primary subjects of the intervention, teachers who acted as facilitators and collaborators, and community members who supported the implementation process. The involvement of teachers was essential to ensure that the play-based activities could be integrated into daily learning practices sustainably.

Problem Identification and Needs Analysis

The initial stage involved participatory diagnosis through observation, informal interviews, and discussions with teachers. This stage aimed to identify challenges related to children's motor development and existing learning practices. The findings indicated that learning activities were still dominated by teacher-centered approaches, with limited opportunities for children to engage in active and movement-based learning. In addition, the lack of structured play activities and variation in teaching strategies contributed to suboptimal motor skill development. These conditions highlighted the need for a play-based intervention that is engaging, structured, and developmentally appropriate. Furthermore, this condition indicates a gap between recommended early childhood learning principles and actual classroom practices in the field.

DOI: 10.64840/jcosece.v2i1.119

Stages of Program Implementation

The implementation of this community service program followed four stages based on the PAR cycle:

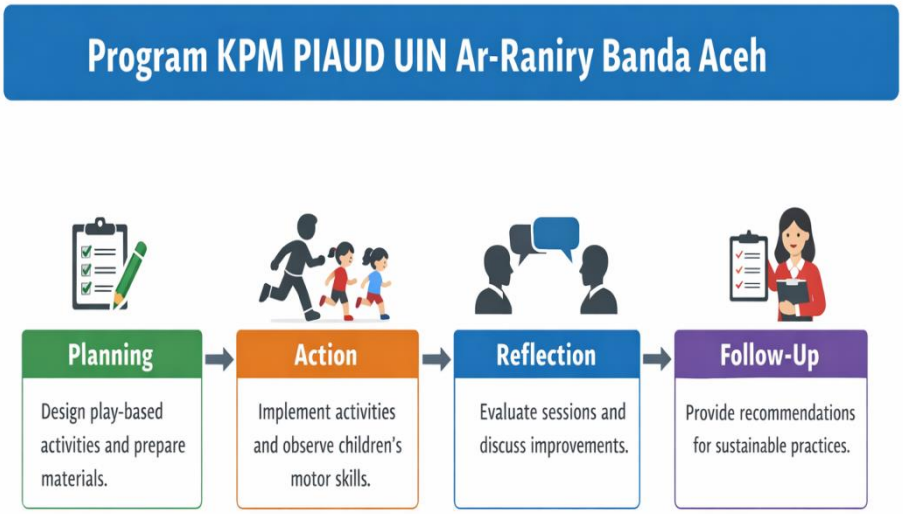

Figure 1. Participatory Action Research (PAR) Cycle in Play-Based Community Service Program

Planning Stage

At this stage, the service team and teachers collaboratively designed play-based learning activities aimed at improving children's gross motor skills. The planning included preparing activity scenarios, selecting appropriate games, and determining motor development indicators such as balance, coordination, and agility. Activities were designed using simple and locally available materials to ensure sustainability and ease of implementation. The planning process also ensured that all activities were aligned with children's developmental characteristics.

Action and Observation Stage

The planned activities were implemented through structured play sessions involving children directly. Activities included jumping, balancing, running games, and group play designed to enhance coordination and body control. During implementation, observations were conducted to monitor children's participation, engagement, and motor skill development. The learning process became more interactive, allowing children to actively explore and develop their physical abilities through play.

Reflection Stage

After each session, reflective discussions were conducted between the service team and teachers to evaluate the effectiveness of the activities. This stage aimed to identify strengths, challenges, and areas for improvement. The reflection process

enabled continuous refinement of the learning strategies, ensuring that the intervention remained responsive to children's needs and developmental progress.

Follow-up Stage

The follow-up stage involved providing recommendations to teachers regarding the continuation of play-based learning activities. Teachers were encouraged to integrate these activities into daily learning routines. In addition, guidance was provided on how to adapt and develop similar activities using available resources, ensuring the sustainability of the program beyond the intervention period.

Data Collection Techniques

Data were collected using observation and documentation techniques. Observations focused on children's motor development indicators, including balance, coordination, and movement control. Documentation included field notes, photographs of activities, and records of children's participation. These data were used to support the analysis and provide evidence of program implementation.

Data Analysis

The collected data were analyzed using descriptive qualitative analysis. The analysis involved identifying patterns of improvement in children's motor skills and participation levels during the program. Comparisons were made between initial conditions and post-intervention outcomes to evaluate the effectiveness of the play-based activities in improving motor development.

Ethical Considerations

Ethical considerations were maintained throughout the program implementation. Participation was voluntary, and consent was obtained from teachers and school authorities. All activities were designed to be safe and appropriate for children's developmental stages. Documentation involving children was handled carefully to ensure privacy and confidentiality.

RESULTS AND DISCUSSION

Results

This section presents the findings of the community service program implemented at Hafidzul Ilmi Kindergarten, Desa Blang Krueng, Banda Aceh. The results are organized based on the stages of the Participatory Action Research (PAR) approach to demonstrate the progression and impact of the play-based intervention on children's motor development and learning engagement.

Planning Stage

The planning stage began with a collaborative discussion between the service team and teachers to identify the core problems related to children's motor development. The initial findings revealed that learning activities were still

DOI: 10.64840/jcosece.v2i1.119

dominated by sedentary and teacher-centered approaches, with minimal opportunities for children to engage in structured physical activities. As a result, children showed limited movement exploration and low participation in motor-based tasks.

Based on these conditions, a series of play-based learning activities were systematically designed to stimulate gross motor skills, including balance, coordination, and agility. The activities were adapted to children's developmental characteristics and implemented using simple, safe, and locally available materials. This stage played a crucial role in ensuring that the intervention was contextually relevant and could be sustainably applied by teachers in daily learning practices.

Action Stage (Implementation of Activities)

The implementation stage involved the direct application of play-based learning activities with children aged 4–6 years. The activities were conducted in a structured yet flexible manner, allowing children to actively participate while still being guided by teachers. Types of activities included jumping over obstacles, balancing on lines, running in coordinated group games, and following movement instructions.

During the implementation, children showed a significant increase in enthusiasm and engagement. Initially, several children appeared hesitant and less confident in performing physical activities. However, as the sessions progressed, children became more active, confident, and willing to participate in various movement-based tasks. The learning atmosphere also shifted from passive to dynamic, where children were not only physically active but also socially engaged through group play.

Figure 2. Implementation of Play-Based Activities to Improve Children's Motor Skills

Observation Stage

Observations conducted throughout the implementation process indicated a gradual and consistent improvement in children's motor development. At the

beginning of the program, many children experienced difficulties in maintaining balance, coordinating movements, and following sequential physical instructions. Some children also showed low confidence when participating in group activities.

After several cycles of play-based intervention, notable improvements were observed. Children demonstrated better control of body movements, increased ability to maintain balance, and improved coordination between body parts during activities. In addition, children became more responsive to instructions and showed greater independence in completing movement tasks.

Another important finding was the increase in children's social interaction during play activities. Children were more willing to collaborate, take turns, and participate in group games, indicating that the intervention not only improved motor skills but also supported social development.

Evaluation Stage

The evaluation stage involved assessing the overall effectiveness of the program in improving children's motor development and learning engagement. The results showed that the majority of children experienced noticeable progress in key motor indicators, including balance, coordination, and agility.

From a qualitative perspective, children who initially showed low motor ability began to demonstrate significant improvement in performing structured movements. They were able to follow activity instructions more accurately and perform movements with better control. In addition, the level of participation increased significantly, with children showing greater enthusiasm and confidence in engaging in physical activities.

Teachers also reported positive changes in their teaching practices. They became more confident in implementing play-based learning strategies and more aware of the importance of integrating physical activities into daily learning. The program also encouraged teachers to be more creative in designing simple yet effective learning activities using available resources.

Figure 3. Evaluation and Reflection of Play-Based Learning Activities

DOI: 10.64840/jcosece.v2i1.119

Discussion

The findings of this community service program indicate that play-based learning activities significantly enhance early childhood motor development, particularly in terms of balance, coordination, and agility. The observed improvements confirm that structured physical engagement provides essential stimulation for neuromuscular development and movement control in young children. Recent studies emphasize that early motor competence is closely linked to children's physical health and readiness for formal learning, as it supports both cognitive processing and behavioral regulation (Barnett et al., 2022; Logan et al., 2021). The progressive improvement observed in this program suggests that consistent exposure to movement-based activities plays a crucial role in optimizing children's developmental trajectories.

In addition to physical development, the results demonstrate that play-based interventions contribute to increased engagement and participation among children. The shift from passive to active involvement reflects the effectiveness of experiential learning approaches, where children construct knowledge through direct interaction with their environment. This aligns with recent research highlighting that guided play enhances motivation, attention, and learning outcomes in early childhood settings (Weisberg et al., 2023; Pyle et al., 2022). The increased enthusiasm and confidence observed during the program further indicate that play-based learning creates a supportive and enjoyable learning environment, which is essential for holistic child development.

From a pedagogical perspective, this program also contributed to improving teachers' instructional practices. The collaborative implementation using the PAR approach enabled teachers to actively participate in designing and evaluating learning activities, thereby enhancing their professional competence. This finding is consistent with recent studies showing that teacher involvement in reflective and participatory programs leads to more effective and sustainable teaching practices (Egert et al., 2020; Kemmis et al., 2022). The ability of teachers to adopt play-based strategies using simple and accessible materials also demonstrates that innovation in early childhood education does not necessarily require advanced resources but rather adaptive and context-sensitive approaches.

Furthermore, this program highlights the importance of contextual and community-based interventions in addressing educational challenges in early childhood settings. Unlike many standardized programs, this intervention was designed based on actual needs identified in the field, ensuring its relevance and applicability. Recent literature emphasizes that community-based and low-cost interventions can produce meaningful and sustainable impacts, particularly in resource-limited environments (Bakken et al., 2021; Yoshikawa et al., 2020). Therefore, this program not only contributes to improving children's motor development but also offers a practical model that can be replicated and adapted in

similar contexts to support early childhood education.

Community Service Contribution

This community service program contributes to improving early childhood motor development, particularly in balance, coordination, and agility, through structured play-based activities that also enhance children's participation and confidence. At the institutional level, the program strengthens teachers' competencies in implementing interactive and context-based learning using simple and accessible materials, supporting sustainable classroom practices. Academically, this program offers a practical and replicable model of play-based intervention integrated with the Participatory Action Research (PAR) approach, providing meaningful implications for educators, practitioners, and policymakers in developing effective and low-cost early childhood education programs.

Limitations and Suggestions

This program has several limitations, including its relatively short duration (40 days), limited number of participants, and implementation in a single educational setting, which may affect the generalizability of the findings. In addition, variations in children's abilities and the reliance on qualitative observation limit the depth of evaluation. Therefore, future programs are recommended to be conducted over a longer period, involve a larger and more diverse sample, and incorporate quantitative assessment methods to strengthen the validity of results. Continuous mentoring and the integration of innovative approaches are also suggested to enhance the sustainability and scalability of the program.

CONCLUSION

This community service program demonstrates that play-based learning activities are effective in improving early childhood motor development, particularly in balance, coordination, and agility. The implementation of structured and engaging physical activities contributes not only to children's motor skills but also to their participation, confidence, and social interaction during the learning process. Furthermore, the program strengthens teachers' capacity in designing and implementing interactive and developmentally appropriate learning strategies. The use of simple and context-based materials highlights that effective learning interventions can be achieved even in limited-resource settings. Overall, the findings confirm that the objectives of the program have been successfully achieved. For future implementation, it is recommended to expand the duration and scope of the program, integrate more comprehensive evaluation methods, and encourage continuous collaboration between educational institutions and communities to ensure sustainable impact.

ACKNOWLEDGEMENT

DOI: 10.64840/jcosece.v2i1.119

The authors would like to express their sincere gratitude to the Early Childhood Islamic Education Study Program (PIAUD), UIN Ar-Raniry Banda Aceh, for supporting the implementation of this community service program. Appreciation is also extended to the head of Hafidzul Ilmi Kindergarten and all teachers who actively participated and contributed to the success of the program. The authors also thank the children and community members of Desa Blang Krueng, Kecamatan Darussalam, Banda Aceh, for their cooperation and enthusiasm throughout the implementation process. Their participation has been invaluable in achieving the objectives of this program.

AUTHOR CONTRIBUTION STATEMENT

DF, RPJ, A, and MBI contributed to the conceptualization and design of the community service program. DF was responsible for coordinating the program and writing the manuscript. RPJ and A conducted field implementation, including facilitating activities and collecting data. MBI contributed to supervision, validation, and critical revision of the manuscript. All authors were involved in data analysis, interpretation of results, manuscript revision, and approved the final version for publication.

AI DISCLOSURE STATEMENT

The authors used ChatGPT during the preparation of this manuscript to assist in structuring the content, improving language clarity, and enhancing academic writing quality. After using the tool, the authors carefully reviewed, revised, and validated all content and take full responsibility for the integrity and originality of the final manuscript.

CONFLICTS OF INTERES

The authors declare that there are no financial, institutional, or personal conflicts of interest that could have influenced the implementation of this community service program, the analysis of data, the preparation of the manuscript, or its publication.

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