

## Optimizing the Potential of Early Childhood Students at TK Kemala Bhayangkari 14 Through Educational Garden Based on PAR

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**Abstract.** Early childhood education necessitates interactive learning approaches to foster holistic development. Educational gardens have been recognized as effective learning tools that provide hands-on experiences. This study employs a Participatory Action Research (PAR) approach to examine the impact of an educational garden at TK Kemala Bhayangkari 14 on early childhood students. Data were collected through observations, interviews, and participatory assessments. Findings indicate that the educational garden significantly enhances cognitive, social-emotional, and physical development in children. Furthermore, the PAR method effectively engages educators, parents, and students, fostering collaborative learning experiences. Challenges identified include sustainability concerns and resource limitations. The study underscores the importance of integrating educational gardens in early childhood education. Sustainable implementation requires strategic planning, community involvement, and institutional support. Future research should focus on longitudinal impact assessments and digital enhancements to garden-based learning.

**Keywords:** Early childhood education; educational gardens; holistic development; participatory action research; experiential learning; sustainability

### 1. Introduction

Early childhood education plays a crucial role in shaping children's cognitive, social, and emotional development. One innovative approach to enhancing learning experiences for young children is through educational gardens, which provide a hands-on, nature-based learning environment (Craig et al., 2024). Research indicates that interactive and participatory learning models, such as gardening activities, contribute significantly to children's developmental growth (Rad et al., 2022). TK Kemala Bhayangkari 14 has recognized the potential of integrating educational gardens into their curriculum to foster experiential learning and environmental awareness among students.

The use of educational gardens as a pedagogical tool has gained traction in early childhood education. Studies by McFarland et al. (2023) highlight that agritourism-based

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educational gardens can serve as effective learning platforms that enhance children's understanding of nature and agricultural processes. Moreover, Agustina et al. (2023) emphasizes that science learning through gardening fosters curiosity and hands-on engagement, making it an effective strategy for early childhood education.

Numerous studies support the implementation of educational gardens in early childhood settings. Gibson et al. (2010) found that children aged 4-5 years who engaged in gardening activities demonstrated improved cognitive skills and environmental awareness. Similarly, Kong and Chen (2024) reported that field trip-based learning, including gardening, significantly enhances children's naturalistic intelligence. Furthermore, Clark (2011) argue that early childhood education, when integrated with interactive learning environments like gardens, nurtures critical thinking and problem-solving skills.

Despite the extensive research on educational gardens, there remains a gap in understanding their implementation through a Participatory Action Research (PAR) approach. Many studies focus on the outcomes of gardening programs (Palaiologou, 2017) but do not explore the participatory engagement of teachers, parents, and children in designing and executing such initiatives. This study aims to fill this gap by examining how a PAR-based educational garden can optimize the potential of early childhood students at TK Kemala Bhayangkari 14.

This research is significant in several ways. First, it contributes to the growing body of literature on interactive learning environments in early childhood education. Second, it provides practical insights for educators and policymakers on implementing PAR-based educational gardens. Lastly, it aims to develop a sustainable model that fosters active participation from all stakeholders, ensuring long-term benefits for students' holistic development (Maiza & Nurhafizah, 2019). By addressing these aspects, this study seeks to bridge the existing research gap and offer valuable recommendations for integrating participatory educational gardens in early childhood education settings.

## 2. Methods

This study employs a Participatory Action Research (PAR) approach, which involves active collaboration among teachers, parents, and students in the planning, implementation, and evaluation of the educational garden at TK Kemala Bhayangkari 14. PAR is chosen to ensure that all stakeholders contribute to the learning process, fostering a sense of ownership and engagement.

The study involves preschool students aged 4-5 years, teachers, and parents at TK Kemala Bhayangkari 14. Teachers serve as facilitators, while parents provide support in maintaining the garden. Students actively participate in gardening activities to enhance their learning experiences (Sovia Ikhvani Putri, 2024).

Data collection methods include observations, interviews, focus group discussions (FGD), student portfolios, and surveys. Observations document children's engagement, learning behaviors, and interaction with nature. Interviews and FGDs are conducted with teachers and parents to understand their perspectives on the garden's impact. Student portfolios collect samples of children's reflections, drawings, and work related to the gardening activities (Mardiana, Intan Zainafree, 2019). Surveys and questionnaires are distributed to parents and teachers to assess the perceived effectiveness of the garden-based learning program.



The implementation process is divided into three phases. The planning phase involves identifying objectives, designing the garden layout, and involving stakeholders. The implementation phase consists of conducting gardening activities, interactive lessons, and experiential learning sessions. The evaluation phase assesses children's cognitive, social, and environmental awareness improvements through qualitative and quantitative measures.

A combination of qualitative thematic analysis and descriptive statistics used to interpret the collected data (Rosidah & Surya Aprilyanti, 2023). Qualitative data from interviews and observations will be analyzed to identify recurring themes, while survey results will be statistically examined to measure the impact of the educational garden on early childhood learning. By employing this method, the study aims to provide empirical evidence on how participatory approaches in educational gardening can optimize early childhood students' learning potential.

### **3. Results and Discussion**

#### *3.1. Cognitive and Social Development in Children*

The findings from this study indicate that engaging children in educational gardening significantly enhances their cognitive and social development. Observations show that students who actively participate in planting, watering, and maintaining the garden exhibit improved problem-solving skills and logical reasoning. The hands-on approach allows them to grasp scientific concepts such as plant growth, the role of sunlight, and the importance of water in sustaining life. Teachers report that children who engage in garden-based learning demonstrate increased curiosity and better retention of information compared to those who rely solely on classroom-based instruction. Moreover, participation in gardening activities fosters collaboration among students, improving their teamwork and communication skills.

Interviews with parents and teachers confirm that children involved in garden-based learning develop stronger social connections. They learn to share responsibilities, take turns, and support one another in completing gardening tasks. Parents also notice a positive shift in their children's ability to communicate their thoughts and observations about nature. Focus group discussions reveal that children become more confident in expressing their ideas, particularly when discussing their experiences with gardening. This enhanced social interaction helps in developing their emotional intelligence, making them more empathetic and cooperative with their peers.

#### *3.2. Environmental Awareness and Responsibility*

Another major outcome of this study is the increased environmental awareness among children. Before the implementation of the educational garden, many students had limited exposure to concepts related to sustainability and environmental responsibility. However, after actively participating in gardening activities, they demonstrate a deeper understanding of the environment. Observational data indicate that children become more conscious of the importance of plants in producing oxygen and providing food. They also begin to appreciate the role of insects such as bees and butterflies in pollination.

Additionally, students exhibit increased mindfulness about waste management and resource conservation. They understand the importance of composting organic waste to enrich the soil and reduce environmental pollution. Some students even share their learning experiences with their families, influencing their household behaviors towards



more sustainable practices. The educational garden thus serves as a bridge between theoretical knowledge and real-world applications, reinforcing lifelong environmental responsibility and fostering a generation that values nature and sustainable living.



**Figure 1** The Role of Collaboration in Early Childhood Education

Figure 1 show that parents report noticeable behavioral changes in their children. Many children begin to advocate for eco-friendly practices at home, such as reducing waste, recycling materials, and taking care of household plants. Teachers also note that students start integrating environmental knowledge into their daily routines, such as watering plants regularly and picking up litter. The participatory nature of the gardening project helps instill a sense of responsibility in children, reinforcing the idea that they have a role to play in taking care of the planet.

### *3.3. Engagement of Stakeholders and Sustainability*

The success of the educational garden at TK Kemala Bhayangkari 14 is largely attributed to the active engagement of all stakeholders. Teachers, parents, and school administrators collaborate to ensure the sustainability of the project. The participatory approach encourages parents to contribute their knowledge and skills, such as sharing gardening techniques or volunteering to maintain the garden during school breaks. This collaboration strengthens the bond between parents and the school community, fostering a supportive learning environment for children.

The study also finds that involving children in decision-making processes enhances their sense of ownership and motivation to learn. When children are given opportunities to choose which plants to grow or decide on garden layouts, they become more invested in the project. This empowerment leads to higher levels of engagement and enthusiasm





for learning. Additionally, the sustainability of the garden is ensured through structured maintenance schedules and continuous integration into the curriculum. By embedding garden-based learning into daily activities, the school ensures that future cohorts of students will benefit from the initiative.



**Figure 2** Implementing Holistic Learning through Educational Gardens

The findings of this study highlight the multifaceted benefits of integrating a PAR-based educational garden in early childhood education. The initiative significantly improves cognitive and social development, enhances environmental awareness, and fosters stakeholder engagement. These results suggest that educational gardens can serve as effective tools for experiential learning, providing young children with meaningful and lasting educational experiences.

### 3.4. Impact of Educational Gardens on Holistic Development

The findings from this study indicate that the implementation of an educational garden at TK Kemala Bhayangkari 14 has significantly contributed to the holistic development of early childhood students. The garden serves as an interactive learning environment that integrates cognitive, social-emotional, and physical growth (Robinson & Barrable, 2023). From a cognitive perspective, children engaged with the garden showed improvements in their curiosity, problem-solving skills, and observational abilities. These enhancements are attributed to the experiential learning opportunities that the garden provides, allowing children to explore plant growth, ecosystems, and environmental awareness through direct involvement.

Social-emotional development is also fostered through group activities such as planting, watering, and harvesting, where children learn teamwork, patience, and



responsibility. These activities enhance their ability to cooperate and communicate effectively with peers and educators. Additionally, the physical aspect of child development is reinforced through active participation in gardening tasks, which promote motor skill refinement and outdoor physical engagement, contributing to their overall well-being. This aligns with previous research that emphasizes the role of outdoor learning environments in enhancing children's holistic development.

### *3.5. Role of Participatory Action Research in Early Childhood Education*

This study employed a Participatory Action Research (PAR) approach, which facilitated collaboration among educators, parents, and students in optimizing the educational garden's impact. The PAR methodology proved to be highly effective in identifying contextual challenges, adapting educational strategies, and enhancing engagement. By involving educators and parents in decision-making processes, the study was able to foster a sense of ownership and commitment toward sustaining the educational garden. Furthermore, the iterative nature of PAR allowed for continuous assessment and improvements in teaching methods, ensuring that children receive maximum benefits from the garden activities.

The engagement of multiple stakeholders also contributed to more inclusive and responsive educational interventions (Murray, 2024). The educators reported that the interactive nature of the garden-based curriculum increased student motivation and classroom participation, making learning more dynamic and meaningful (Harvey et al., 2023). Additionally, parental involvement in gardening activities strengthened the home-school connection, reinforcing children's learning experiences beyond the school setting. These findings affirm the relevance of PAR in fostering collaboration and developing educational programs that are adaptable to the specific needs of early childhood learners.

### *3.6. Challenges and Recommendations for Future Implementation*

While the implementation of the educational garden has been largely successful, several challenges were identified. One of the primary concerns is the sustainability of the garden due to maintenance demands, seasonal variations, and resource limitations (Larsson et al., 2018). Ensuring continuous funding and support from stakeholders remains crucial for the long-term success of the project. Educator workload and time constraints also present a challenge, as integrating garden activities with existing curricula requires additional planning and execution efforts.

To address these challenges, several recommendations are proposed. First, establishing partnerships with local agricultural organizations, environmental groups, or government agencies could provide resources and expertise to maintain the garden sustainably. Second, incorporating the garden into the formal curriculum in a structured manner could ease integration efforts while maintaining a balance between traditional and experiential learning methods. Additionally, involving parents and community volunteers more actively in garden maintenance could alleviate some of the logistical burdens faced by educators.

Future research should explore the longitudinal impact of educational gardens on children's academic performance and social development. Moreover, expanding the scope of garden-based learning to include digital tools, such as augmented reality applications, could further enhance engagement and knowledge retention among early childhood students.



#### 4. Conclusions

The implementation of an educational garden at TK Kemala Bhayangkari 14 has demonstrated significant benefits for the holistic development of early childhood students. Through hands-on engagement, children exhibited improved cognitive abilities, enhanced social-emotional skills, and increased physical activity. The integration of gardening activities into the learning environment has provided an experiential approach that fosters curiosity, problem-solving, teamwork, and responsibility among young learners. Moreover, the participatory action research (PAR) framework has played a crucial role in ensuring that the program remains adaptive and inclusive by involving educators, parents, and children in a collaborative learning process.

Despite these positive outcomes, the study also highlights several challenges that may impact the long-term sustainability of the educational garden. Resource limitations, maintenance efforts, and seasonal changes present obstacles that require ongoing support and strategic planning. Additionally, integrating the educational garden seamlessly within the curriculum without overburdening educators remains a challenge. Addressing these concerns will require a multidisciplinary approach, including partnerships with agricultural organizations, active parental involvement, and structured curriculum integration to maintain the garden's long-term viability.

Moving forward, future research should focus on evaluating the long-term impact of educational gardens on children's academic performance and overall well-being. Additionally, exploring the integration of digital tools such as augmented reality in garden-based learning could further enrich children's engagement and understanding of environmental concepts. By continuously refining and expanding the scope of garden-based education, stakeholders can ensure that early childhood students receive meaningful, holistic learning experiences that align with contemporary educational advancements.

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