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PRACTICE-BASED ARTICLE

## Gardening Education in Early Childhood: Important Factors Supporting the Success of Implementing It

Rohmatin Agustina<sup>1,\*</sup>, Fitri Ayu Fatmawati<sup>2</sup>, Faridah Zahriani<sup>3</sup>, Putri Rahma Zulwati<sup>2</sup>, Sukma Fauziah<sup>1</sup>, Ifa Faridah<sup>3</sup>, Tri Hartanti<sup>3</sup>, Nailul Insyarah<sup>3</sup>, Heri Ardiansyah<sup>4</sup>

<sup>1</sup> Department of Agrotechnology, Universitas Muhammadiyah Gresik, Gresik, Jawa Timur

<sup>2</sup> Department of Early Childhood Islamic Education, Universitas Muhammadiyah Gresik, Gresik, Jawa Timur

<sup>3</sup> Aisyah Bustanul Athfal 42 Kindergarten of Gresik, Jawa Timur

<sup>4</sup> Department of Computer Engineering, Universitas Muhammadiyah Lamongan, Kabupaten Lamongan, Jawa Timur, Indonesia

**Corresponding author:** Rohmatin Agustina, [rohmatin@umg.ac.id](mailto:rohmatin@umg.ac.id)

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### Abstract

Preparing children to become the Rabbani, or godly, generation is the parents' choice when educating their children. In Indonesia, children are seen as an investment in the nation, state and religion as they will become the generation to change civilisation for the better. Through gardening education in nursery school, it is hoped that children's monotheism and cognitive, psychomotor and affective development will be achieved. This article offers a service-learning program, developed with the aid of agricultural science and early childhood university education, and partnered with a large social charity, Muhammadiyah. Methods used in this program are group discussion forums, gardening education for class teachers and class action by students in the class. The program involves 60 students aged six at a nursery school, Aisyiyah Bustanul Athfal, in East Java Province, Indonesia.

This program is important as it involves measurable assessment of the educational model, learning tool requirements, methods of delivery and evaluation of activities. The

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program and results shared here demonstrate that gardening education can be accomplished at the nursery school level. Gardening tools are needed, but can be modified to suit this age group. Gardening education for these young children is conducted in accordance with pre-prepared lesson plans. Multilevel learning methods, ranging from reading books, telling stories and watching documentaries to practising and reflecting on gardening activities, are part of the success of this type of gardening education. School support for the implementation of this program markedly determined its success.

## Keywords

**Service-Learning Program; Gardening Education; Early Childhood; Nursery School; Learning Methods**

## Introduction

The presence of children in a family is a gift from God, for which we are very grateful. Preparing them to become Rabbani, or godly, is the choice of all Indonesian parents. Children are also an investment in the nation, state and religion as each generation will hopefully change civilisation for the better. Education for young children is thus very important. According to the United Nations' Sustainable Development Goals, point 4.2 regarding education, by 2030 all girls and boys should have access to early childhood care and development so that they are ready for basic education (UN 2023).

Preparing for a child's education begins in the womb and continues for some years. According to the US-based *National Association for the Education of Young Children* (NAEYC 1997), early childhood spans eight years. We know that in early childhood children's motoric, cognitive and emotional skills are actively growing and developing, and that the pattern of education in early childhood adjusts the pattern of growth and development in children of this age. In the Act of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, Article 1, paragraph 14 states that early childhood education is a coaching effort aimed at children from birth to the age of six, which is carried out through the provision of educational stimuli to assist growth and development – both physical and spiritual – so that children are ready to enter a higher stage of education (Depdiknas 2003). Meanwhile, UNESCO, with the approval of its member countries, divides education into seven levels in its *International Standard Classification of Education* (ISCED) document. As set by UNESCO, early childhood education is included at level 0, or pre-school level, namely for children aged 3–5 years.

This article discusses a service-learning program undertaken by university teachers and a large charity organisation based in East Java, Indonesia, that specialises in childhood education. While similar programs have been conducted in the past in Indonesia, they have been carried out in the absence of fully prepared lesson plans and methods of assessment. Lesson plans provide the teachers with the appropriate learning methods (activities) to use in order to achieve specific learning objectives. Based on the character of early childhood and an appropriate curriculum, learning methods are important in effectively conveying learning objectives. The outdoor learning method is effective in early childhood, as it is a form of learning through life simulation activities, creative, recreational and educational games, both individually and in groups, with the aim being self and group development (Hamzah 2020).

Outdoor learning through gardening is effective, even in early childhood. It has a positive impact on children's development and helps them to understand science more easily (Mirawati & Nugraha 2017; Sonia 2021). It also increases environmental awareness (Budi & Krisna 2013; Dwi Marietta et al. 2021) and children's cognitive development (Fitriah et al. 2021). It encourages an entrepreneurial spirit in early childhood (Fithriyana et al. 2016) and interest in nutritional education (Hinga & Indriati 2019); increases knowledge of the natural environment (Indrayani 2021; Resi Meirahayu 2017; Utami 2020); spurs language development in early childhood (Toyibah 2018); and fosters monotheism and Islamic values (Ananda 2017).

## RATIONALE AND GOALS FOR THE OUTDOOR GARDENING PROGRAM

Gardening education, amongst other things, can be achieved if it fulfils the matrix indicators of early childhood development ([Wood 2018](#)), as outlined below.

1. Health domain. (a) Children will be motivated to enjoy eating vegetables if they are introduced to vegetables and gardening activities early in life. Activities, such as planting, caring for, harvesting, and cooking and eating vegetables together at school with friends and teachers will help them to enjoy these activities. (b) Physical activity and education in gardening are held for at least 60 minutes 5 days per week as these activities can strengthen children's motor skills. (c) After every gardening activity, the children are offered milk to drink. (d) When participating in gardening education, students bring a supply of fruit or vegetables from home. (e) Mental health develops well because children learn while tending plants in the garden.
2. Learning domain. (a) Children will be more active in learning as they do this while playing in the garden. (b) Children's language will develop well as they add new words to their vocabulary. (c) Children will be able to count to more than 10 in sequence and understand standard units, for example, long, short, small, large. (d) Children will advance in literacy because gardening education includes reading story books. (e) Children will be able to recognise basic shapes easily through witnessing various forms of plant organs, including leaves, stems, roots and flowers. (f) Various methods of education will be included, starting with teachers reading books and storytelling, and then colouring in, drawing and gardening practices. (g) Understanding of letters and numbers, the vocabulary of living things and language development will be achieved using easy-to-understand media in the garden. (h) Gardening materials and tools made according to Indonesian national standards (SNI) will be used. (i) Increased knowledge of the environment will occur. (j) Increased motor skills will be developed by the children.

The outdoor area is a garden facility that is safe for children. Learning is done in groups, divided into large groups and small groups, and each child receives gardening tools.

3. Social and emotional development. (a) Children develop good social behaviour because gardening education teaches them to work together in groups. (b) They learn patience as they observe and follow the growth of the plants until they are harvested. (c) They also become more independent because each is given responsibility for planting, caring for and harvesting their crops. (d) The children develop the courage and willingness to articulate the process of growing their plants. (e) They also exhibit good social-emotional balance through cultivating patience and responsibility, as well as independence.
4. Family context. (a) At home, children who have attended gardening education classes may become more loving to their family. (b) They also may become more disciplined and independent at home. (c) Some of the activities encouraged by this education method are reading plant books with parents, and drawing and colouring in plants with parents at home which can build a healthy emotional relationship and two-way communication between the parents and the children. (d) At home, children may become more attentive and affectionate with their pets. (e) They also independently learn to make decisions about situations they face, for example, understanding that if the plants are not watered, they will die.
5. Community context. (a) Children are taught to share their crops and what they have learnt with friends, family and teachers. This hones the social nature of children and children's empathy for the environment. (b) As mentioned, the school environment is Islamic-based, and as such gardening education supports understanding of monotheism (divinity).

As can be seen, there are many positive values that are awakened in early childhood through planned gardening activities. The university implements learning at an early age through gardening activities, in partnership with nursery schools at Aisyiyah Bustanul Athfal in East Java, Indonesia.

## Partner Profiles

Community service activities are one of the tridharma (three teachings) of higher education; the others are research and teaching, which must be carried out by lecturers. The Directorate General of Higher Education in Indonesia supports the tridharma programs. The community service undertaken by lecturers involves implementation of the research results. The gardening community service is carried out by a team of devotees from the agricultural science cluster and the field of early childhood education at Muhammadiyah universities.

The partner in this community service activity is Aisyah Kindergarten, an educational institution which is also a Muhammadiyah charity. Muhammadiyah is one of the largest social organisations in Indonesia, with one section being a business charity working in the field of education from early childhood to senior level. Aisyah Kindergarten is part of Muhammadiyah, whose movement is administered by women. Aisyah's head of the centre gives directions on the importance of protecting nature and the environment in controlling natural disasters, which is in line with his directive. We, as a service team from the universities, feel it is necessary to instil love for the environment in children at an early age, through penetration of gardening education for students aged five to six years, in partnership with Aisyah Kindergarten.

Aisyah's vision is to establish an Islamic independent nursery school, with the mission of (1) conducting creative Islamic pre-school education; (2) equipping students with good character (*akhlakul karimah*); and (3) providing students with life skills on a global scale based on Information and Communications Technology. The objectives of the nursery school are (1) to educate Muslim children and adults to be noble, capable, confident and useful members of the society, nation and state; (2) to help lay the foundation for the development of good attitudes, behaviour, knowledge, language and creativity needed by children to adapt to the environment and their subsequent growth and development; (3) develop the seeds of faith and devotion to Allah SWT in children's personalities from an early age, which will manifest in the development of both a physical and spiritual life in line with their level of development.

Over the last two years, Aisyah's kindergarten has used the 2013 curriculum and also integrated it with the Local Curriculum for Nursery School, Aisyiyah Bustanul Athfal, which has adapted it to the local wisdom of the Institute and integrated it with the COVID-19 emergency curriculum, as one of the teaching guidelines for teachers in undertaking their duties as educators, teachers and caregivers. In developing and improving their competence and coaching, various useful activities are undertaken in order to develop strong personalities and professionalism to improve the quality of education in nursery school. In supporting learning, the nursery school provides various facilities, including swimming pools and school gardens.

Gardening education is an effective option for early childhood education as it uses methods appropriate to early childhood development. Development and growth in early childhood involves several characteristics, including curiosity, fantasising and imagining, which have the most potential for learning, an egocentric attitude and short concentration ([Amini & Aisyah 2014](#)). Based on these characteristics, the following aspects of early childhood education curricula are of concern ([Kartadinata & Sunaryo 2003](#)): (a) Children require a sense of security, rest and good food; (b) they come into a world programmed to imitate; (c) they need routine and practice; (d) they need to ask lots of questions and receive answers; (e) they think differently from adults; (f) they require direct experience; (g) for them trial and error is the most important aspect of learning; (h) playing is the world of childhood.

Based on these features of early childhood development and requirements, an early childhood education curriculum was developed ([Suryana 2014](#)). Religion-based early childhood education institutions have also developed an early childhood education curriculum, incorporating Islamic values in their learning ([Ananda 2017](#)).

## Partner Situation Analysis

Implementation of gardening learning has gradually occurred in schools, starting with play groups (KBs) and continuing on to nursery school level. Previously, gardening learning was undertaken by the teacher by introducing plants to the classroom, while later students undertook the planting and harvesting of plants in the garden without measurable assessments as indicators of learning outcomes.

### CONTEXT

Gardening learning is carried out in the form of community service in Aisyiyah Bustanul Athfal 42 Gresik play group/nursery school in East Java, an early childhood school with an Islamic religious platform. The institution is one of the charitable efforts of social organisations in Indonesia, namely Muhammadiyah, which is engaged in education.

The age level of children in the playgroup (KB) is three to four years, and in the nursery school (TK) it is five to six years. Nursery school is divided into TK A level at the age of five years and TK B at the age of six years. The students involved in our activities were 60 nursery school Level B students (aged 6 years), who were divided into three classes, each class comprising 20 students, with one class teacher.

### PROGRAM IMPLEMENTATION

The method of implementing this program was through group discussion forums, training for class teachers, class action by students and evaluation of activities. Group discussion forums related to the preparation of activities were held with the school principal, class teachers and service teams from tertiary institutions before the activities began. The purpose of the discussion was to convey the plans and objectives of the activities to partners, and to determine the rules for implementing activities, work descriptions and the schedule of activities so that later they would work well. The training of class teachers was conducted by the teaching team and involved class action exposure training, which would be carried out for children by the class teacher and the service team. Further, a class action was carried out to demonstrate the implementation of gardening education. Class actions included reading books together, telling stories, practising planting seeds, caring for plants, harvesting, cooking vegetables and eating vegetables.

### LEARNING TOOLS FOR EARLY CHILDHOOD GARDENING EDUCATION

Learning tools for gardening education in early childhood include two things: hardware in the form of garden facilities and infrastructure, and software in the form of a learning syllabus. The existence of land or gardens is important in gardening education as an education facility. The garden model can adapt to the local wisdom of the school, while garden infrastructure is in the form of gardening equipment and materials. Gardening materials include seeds, planting media, water and fertiliser. The necessary gardening tools include aprons, gloves, shovels, a small hoe and a small rake. In addition to the hardware required, a learning syllabus is needed. Lesson plans are prepared for every class meeting or class action. Learning intervals can be based on predetermined learning outcomes along with achievement indicators. To measure the achievement of indicators, an assessment is carried out on each class action. The assessment is prepared based on a measurable assessment rubric with certain intervals of numbers and points.

## Methods of Delivering Material on Early Childhood Gardening Education

Universities work with partners to implement a gardening education model for children in early childhood, applying several measurable class actions to each learning achievement.

Determination of learning outcomes, with multi-level achievement indicators, is very important in the early stages of the process so that the learning objectives can be realised. Achievement indicators for each aspect of learning are measured through assessment. Our gardening education syllabus requires learning outcomes of increased knowledge of monotheism, science, naturalism, love for the environment and students' Islamic character, including: (a) students are able to show knowledge of monotheism through understanding the nature of Allah (Asmaul Husna); (b) students are able to understand the form and function of plants through knowledge of plant growth processes, and an ability to distinguish plant organs, namely leaves, roots and stems, as well as the function of each plant organ; (c) students exhibit knowledge of nature through plant caring activities, such as watering plants, fertilising and cleaning weeds; and (d) students are able to show good character (*akhlakul karimah*) and love for the environment through their ability to grow, maintain and harvest plants.

Based on this learning, the level of success can be measured. The achievement indicators include: (a) students are able to show, name and distinguish objects created by Allah from those created by humans; (b) identify plant organs, draw them and state their functions; (c) measure plant growth; (d) water plants, provide fertiliser and clear weeds from the plants; (f) plant plants and maintain them properly; (g) harvest crops; and (h) cook and eat the vegetables harvested from their gardens

Class action is the implementation stage of delivering predetermined learning outcomes. The classroom actions that we undertook with the students measured their cognitive, psychomotor and affective abilities. Some of these are outlined below.

#### 1. Book reading

The initial class action involved reading storybooks on the topic of gardening. This activity aimed to deliver an initial understanding of the gardening activities in which the children would be participating. Our procedure involved the class teacher reading the book to the students, and the students listening and then retelling the story. Finally, both students and teacher would read the book as an act of reflection. This activity helps train children's cognitive abilities so that children can understand the process of plant growth and the benefits of plants to life through literacy skills, for example by colouring in and drawing plants.



Figure 1. Storybook reading activity

## 2. Storytelling

Storytelling is the act of conveying a story using expression and songs so that children become more receptive to what the storyteller is conveying. Storytelling was implemented in the second stage, after the students had listened to the story of *Pak Budi's Garden*, in the hope that they would better understand the gardening activities in which they would be involved. When participating in storytelling, children become more enthusiastic and expressive. This activity can help train children's language and expression skills, that is, they can express their understanding through spoken language or gestures.



Figure 2. Storytelling

## 3. Watching documentary films in animated form

In the third stage, we invited children to watch documentary films in animated form on the theme of plants. The goal was for children to gain a visual picture of the process of plant growth and farming. This activity can help train children's cognitive and language abilities, and can also help them to increase their knowledge of plants scientifically, from growing to producing seeds. Through film, children can acquire a better understanding of the procedures for growing plants, caring for plants, and harvesting and cooking crops.



Figure 3. Watching a documentary film

4. Learning about farming practices in the garden

Practices include planting and caring for plants (fertilising, removing weeds) and harvesting. These activities can train children’s psychomotor skills through activities such as planting seeds, watering plants, fertilising plants, clearing weeds and harvesting vegetables. They can help children’s understanding of plant growth through such activities as measuring plant height and number of leaves. They also help cultivate a compassionate attitude towards living things through caring for plants by watering, fertilising and clearing weeds from the plants.

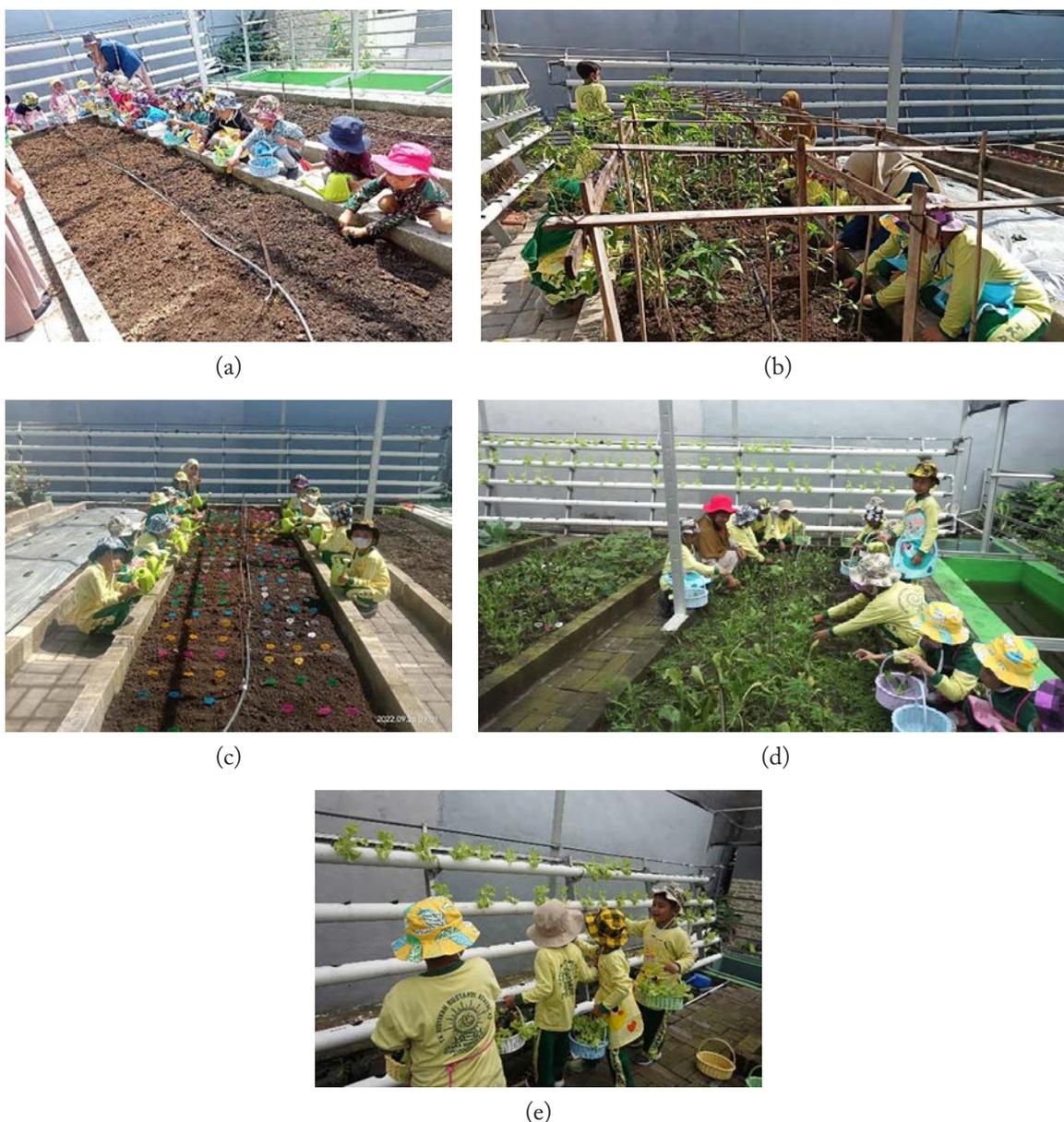


Figure 4. Learning practice in the garden: (a) planting seeds, (b) clearing weeds, (c) watering the plants, (d) harvesting mustard greens, (e) harvesting lettuce

## 5. Cooking and eating vegetables

The final activity for the children was to cook the vegetables and eat them together. This activity trains children's psychomotor skills, including cutting vegetables and holding a knife, a frying pan, and a fork and spoon. Affective training includes cultivating a patient attitude through eating together, getting used to praying before and after eating, and tidying up eating utensils independently. Children like to eat vegetables when they know the health benefits of them.



(a)



(b)



(c)



(d)

Figure 5. (a) preparing vegetables, (b) sorting vegetables, (c) cooking vegetables, (d) eating vegetables together.

## Evaluation of Activities

Evaluation required distribution of questionnaires to 25 respondents, including school principals, class teachers and student guardians. The evaluation covered assessment of the program learning tools, the education model and the delivery methods. Topics of the questions were (a) Suitability of the activities for early childhood learning; (b) Suitability of the materials used in gardening education for those in early childhood; (c) Methods of delivering gardening education material to those in early childhood; (d) Suitability of the gardening education learning tools used in early childhood (e) Appropriateness of gardening education class actions in early childhood; (f) program benefits; and (g) program sustainability. Answers to questions were measured using Likert scale criteria, namely very weak (score 1), weak (score 2),

adequate (score 3), strong (score 4) and very strong (score 5). The data analysis used SPSS software version 26.

We undertake this after all stages of the class action have been completed. [Table 1](#) below shows the results of the activity evaluation questionnaire.

Table 1. Learning evaluation instruments for gardening education in early childhood

	Instrument	Score	Criteria	Frequency	%	Standev
(a)	Suitability of activities for early childhood learning	60–80	Strong	14	56	1.03
		80–100	Very strong	11	44	
(b)	Appropriateness of learning material for gardening education of children in early childhood	60–80	Strong	15	60	2.91
		80–100	Very strong	10	40	
(c)	Methods of delivering gardening education materials to children in early childhood	60–80	Strong	9	36	1.74
		80–100	Very strong	16	64	
(d)	Appropriateness of learning tools for gardening education in early childhood	60–80	Strong	14	54	1.98
		80–100	Very strong	11	66	
(e)	Appropriateness of class action gardening education in early childhood	60–80	Strong	18	72	1.39
		80–100	Very strong	7	28	
(f)	Program benefits	60–80	Strong	18	72	2.06
		80–100	Very Strong	7	28	
(g)	Continuation of the program	60–80	Strong	20	80	1.71
		80–100	Very Strong	5	20	

## Discussion

It is considered important that gardening education is implemented in nursery school as, in practice, it takes a long time, beginning with planting the seeds. The goals of gardening education include achievement of an understanding of monotheism, development of cognitive insight, affective development of children, development of children's psychomotor gross and fine motor skills, as well as the development of children's skills working with nature. All are considered important in supporting learning achievements in schools. Reading books, storytelling, gardening, and cooking and eating vegetables together are also an essential part of gardening education. Learning tools, such as garden facilities and infrastructure, generally determine the success of gardening education in early childhood. However, it is possible to adapt existing tools through innovation and creativity. A learning implementation plan (RPP) is considered important for smooth

management of gardening education and needs to be prepared according to school learning outcomes. It is also considered beneficial for school teachers, child students and guardians of students. In the words of the school principal:

*this program has a positive impact on student learning outcomes, where previously gardening education had only been carried out for students to grow crops, but through this program, a structured learning achievement and indicator of achievement had been developed, the material presented, the methods used in learning and gardening infrastructure, so that the school supports this program.*

A student guardian testimony stated:

*my child at home likes to water plants, can name various vegetable plants and starts to like eating vegetables.*

And a student said:

*I like to study and play in the garden, I like to eat lettuce, the lettuce tastes sweet*

This program and the gardening facilities could not have been run well without the support, participation and cooperation of the school, namely the principal, teachers, staff and school advisers. In future, the school will include lesson plans for gardening education in this program as part of the school curriculum, and if possible have teachers take part in gardening workshops for young children.

University involvement in the form of assistance with implementation of our research results has been quite important in supporting implementation of gardening education in a variety of disciplines. Agricultural Science clusters are needed to assist in garden construction design that is in accordance with early childhood education, plant cultivation processes and knowledge about plants. An early childhood education science cluster is needed to prepare lesson plans, gardening education learning methods, accompany class teachers, prepare learning media, such as pop-up books for growing vegetables, and compile achievement assessments in each gardening education activity.

## Conclusion

The application of gardening education to early childhood learning can be done at the nursery school level. Gardening learning tools are needed, but can be modified to suit school facilities. The implementation of gardening education in early childhood can be carried out in accordance with prepared lesson plans. Multi-level learning methods, ranging from reading books, telling stories and watching documentaries, to practising and reflecting on gardening activities, are part of the success of gardening education. School support for the implementation of the program greatly determines its success.

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