

Early Childhood Education Curriculum Development Policy through Plants Utilization as Nature-Based Learning Media

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Abstract. The implementation of early childhood education curriculum in Indonesia is very diverse. The current curriculum policy only regulates minimum standards that can be developed according to the conditions of the school environment. One of them is the development of a nature-based learning curriculum. This paper aims to explain the use of one of the principles of nature-based learning for early childhood in the early childhood education curriculum, namely learning to utilize nature. One of the media that can be used for learning in nature-based learning is plants. The method of writing this paper is a literature study, namely through books, journals, papers, and the use of social media to obtain valid and accountable data. The results of the discussion of this paper explain how to use roots, stems, twigs, leaves, flowers, and fruits as early childhood learning media in the early childhood learning curriculum. The results of this study can be used by teachers so that learning activities can be more diverse and interesting

Keywords: Curriculum Policy, Early Childhood Education, Learning Media, Plants

1 Introduction

Early childhood education is a very important foundation in laying the foundation for children's personal development. Its implementation can be carried out in the family, school, and community. Schools are one of the formal educational institutions that must pay attention to the standards governing behavior in schools, including in early childhood education. Standard service for early childhood is one of the policies that must be fulfilled as an early childhood education provider. National standards are used as a foothold in the implementation of the learning process. There are several standards that must be met by early childhood education institutions, namely: 1) early childhood achievement level standards, 2) content standards, 3) process standards, 4) assessment standards, 5) education standards and education personnel, 6) facilities and infrastructure standards, 7) management standards, and 8) financing standards [1].

In connection with the description above, the education provided to early childhood is an effort to create a conducive environment and provide the best for the development of various potential learners. Judging from its implementation, the implementation of early childhood education requires support from various parties, both from the government, the community, and parents.

The support provided must be accompanied by the use of attractive teaching and learning methods in schools. Conventional learning methods make it difficult for early childhood to catch the lessons delivered by educators [2]. One alternative learning model that can be used to restore the nature of children's learning is a nature-based learning model. Nature-based learning for early childhood has many advantages that support children's holistic development, including improving physical development, improving cognitive skills, strengthening mental and emotional health, increasing creativity and imagination, developing social skills, increasing environmental awareness, learning in a fun and interactive way, and no less important is developing resilience and independence.

The surrounding environment can be used as an alternative for teaching and learning activities. This model is expected to establish harmony between the learning material and the natural environment. Nature has a lot of knowledge and is a real source of education. Nature is one of the learning media and can be used as a place to carry out the teaching and learning process [3]. Therefore, it is natural that many early childhood education institutions take nature as a source of inspiration for learning. Children are introduced to nature from an early age, invited to go down to the rice fields, catch fish, and walk to the forest.

2 Method

The method in this writing uses library sources because researchers want to find as much information as possible and relevant to the problem being studied, namely about curriculum development for early childhood using nature-based media that are often found around [4]. The stages used by researchers of course begin with knowing what types of libraries are relevant to the theme, collecting library materials both through print and online, of course before being presented, researchers will select the necessary and important data. Data collection is carried out in depth through various literature on learning media and the use of plants as learning resources obtained through books, magazines, notes, from various media, both print and electronic media such as Facebook, YouTube, Instagram, and Google. This research is more about extracting information and determining the focus of research obtained from the information that has been obtained based on problem priorities. The research procedure involves several stages, including: a. Source Identification: Identifying sources relevant to the research topic through searching academic databases, libraries, and other sources. b. Source Selection: Selecting sources that have been identified based on predetermined inclusion and exclusion criteria. c. Data Collection: Collecting data and information from the selected sources. The data collected can include previous research findings, theories, and relevant concepts. d. Data Analysis: Analyzing the collected data and

information using content analysis techniques or other appropriate methods. This analysis aims to identify patterns, themes, and relationships among variables found in the literature. e. Synthesis of Findings: Synthesizing the findings obtained from the data analysis to form comprehensive and relevant conclusions for the research objectives.

3 Result and Discussion

3.1 Early Childhood Education Curriculum Policy

According to Law Number 20 of 2003 concerning the National Education System, the curriculum is a set of plans and arrangements regarding the objectives, content, and learning materials and the methods used as guidelines for the implementation of learning activities to achieve specific educational goals. Based on this understanding, there are two dimensions of the curriculum. The first dimension is the plans and arrangements regarding the objectives, content, and learning materials, while the second is the method used for learning activities [5].

The Early Childhood Education Curriculum, better known as the 2013 Early Childhood Education Curriculum, contains learning tools ranging from annual programs, weekly programs, and daily programs [6]. Early Childhood Education learning programs are formed based on themes. These themes follow the minimum standard of the Ministry of Education and Culture's eleven themes or be developed according to the school. The eleven themes are about myself, my environment, my needs, animals, plants, recreation, work, water, air, and fire, communication tools, my homeland, and the universe.

One of the models that can be applied in early childhood education learning is the Nature-Based Learning Model. This model is the development of learning innovation in early childhood education. Nature-based learning integrates natural materials such as leaves, twigs, stones, and sand into learning activities. Children can learn to count with stones, recognize shapes with leaves, or even understand color concepts with various flowers. By using natural materials, children do not only learn theoretically but also practically. They feel, see, and directly interact with learning objects. This aligns with the holistic learning approach that emphasizes real experiences as a learning medium for early childhood

3.2 Nature Based Learning

Nature-Based Learning is one of the early childhood learning models that has been the authors' priority since 2016. Nature-based learning was developed to solve the problem of very minimal learning media in the 3T area. The ability of educators to synergize with the natural environment is expected to provide authentic learning solutions with media. It is not only limited to being given task sheets such as writing, drawing, coloring, and pasting. However, it is beyond learning things of a fundamental understanding through natural or artificial objects.

Nature-Based Learning Principles for Early Childhood.

There are three principles of nature-based learning for early childhood [7], namely:

1. Learning about nature
Learning about nature means that nature-based learning models study natural concepts as learning materials.
2. Learning to use nature
Learning to use nature means that nature-based learning models use learning resources available in nature.
3. Learning with nature
Learning with nature means a nature-based learning model where learning uses the natural environment.

Based on these principles, this article will explain how to learn to use natural materials as learning media in the early childhood education curriculum.

Natural Materials in Nature-Based Learning for Early Childhood.

Natural materials are essential materials in implementing the Nature-Based Learning Model [8], [9]. Natural materials used are natural materials that are close to the natural environment. The natural materials that can be used are living things and inanimate objects. Living things include humans, animals, and plants. Meanwhile, inanimate objects include stone, earth, water, air, and fire.

Active Learning and Exploration: Encourage children to actively participate and explore their environment through gardening activities. Connectivity with Nature: Teach the importance of plants for life and instill a love for nature. Development of Observation and Scientific Skills: Record plant growth and conduct simple experiments. Curriculum Integration: Link plant activities with other subjects such as math, science, art, and language. Holistic Approach: Involve physical, emotional, social, and cognitive aspects in activities. Project-Based Learning: Design projects involving plants, such as creating a school garden. By integrating these principles, nature-based learning using plants can provide rich and meaningful learning experiences for early childhood.

This article will discuss the use of plants in nature-based learning for early childhood learning:

3.3 Plant as-a Nature-Based Learning Media

Types of Plants.

Early childhood education teachers who engage in nature-based learning are expected to have broad abilities to understand plants. There are many kinds of plants around us. It starts from plants that we often use as learning media or plants that we can actually use but rarely use as early childhood learning media. Before going into the learning themes in the curriculum, let us get acquainted with the types of plants that we can use in plant learning.

1. Mushrooms

Mushrooms are living things that have a shape resembling a plant but do not have chlorophyll. They cannot carry out photosynthesis, so the nature of mushrooms is like the nature of animals, using food that already exists. In the past, mushrooms were included in the plants category. However, mushrooms have become a separate category because of their uniqueness. Ideas for using roots, stems, twigs, leaves, flowers, and fruits in early childhood education: Roots: Water absorption experiments and observation of root structures. Stems: Learning about plant structure and capillarity experiments. Twigs: Building mini habitats and craft projects. Leaves: Observing leaf shapes and sizes, and learning about photosynthesis. Flowers: Exploring colors and shapes, and observing pollination. Fruits: Observing the ripening process and learning about the taste and nutrition of fruits. By using these plant parts, children can learn about various aspects of plants and ecosystems in an interactive and enjoyable way.

2. Moss

Moss is a small plant that lives on land in a humid place which has the characteristics of not having roots, stems, and leaves and does not have food-carrying reeds. Moss is a pioneer plant where that can grow before other plants can grow in that place. The ideas for using roots, stems, twigs, leaves, flowers, and fruits in early childhood education with moss: Roots: Water absorption experiments with rhizoids and observation of rhizoid structures. Stems: Learning about moss structure (gametophyte) and capillarity experiments. Twigs: Creating mini habitats and craft projects. Leaves: Observing moss leaf shapes and learning about photosynthesis. Flowers: Explaining moss reproduction (sporophyte) and observing spores. Fruits: Spore formation process and observation and documentation. By using various parts of moss, children can learn about different aspects of plants and ecosystems in an interactive and enjoyable way.

3. Ferns

Ferns are plants that already have true roots, stems, and leaves that reproduce by spores. The stems of ferns already have xylem and phloem food transport vessels, chlorophyll, and fibrous roots. Ideas for using roots, stems, twigs, leaves, flowers, and fruits in early childhood education with ferns: Roots: Water absorption experiments and observation of root structures. Stems: Learning about fern structure and capillarity experiments. Twigs: Creating mini habitats and craft projects. Leaves: Observing fern leaf shapes and learning about photosynthesis. Flowers: Explaining fern reproduction (sporophyte) and observing spores. Fruits: Spore formation process and observation and documentation. By using various parts of ferns, children can learn about different aspects of plants and ecosystems in an interactive and enjoyable way.

4. Seed Plants

Seed plants are plants that reproduce using seeds. True roots, stems, and leaves have xylem and phloem transport tissues. Seed plants are divided into plants with open seeds and closed seeds. An example of an open seed plant is a pine plant. Ideas for using roots, stems, twigs, leaves, flowers, and fruits in early childhood education with seed plants: Roots: Water absorption experiments and observation of

root structures. Stems: Learning about seed plant structure and capillarity experiments. Twigs: Creating mini habitats and craft projects. Leaves: Observing leaf shapes and sizes, and learning about photosynthesis. Flowers: Exploring colors and shapes, and observing pollination. Fruits: Observing the ripening process and learning about the taste and nutrition of fruits.

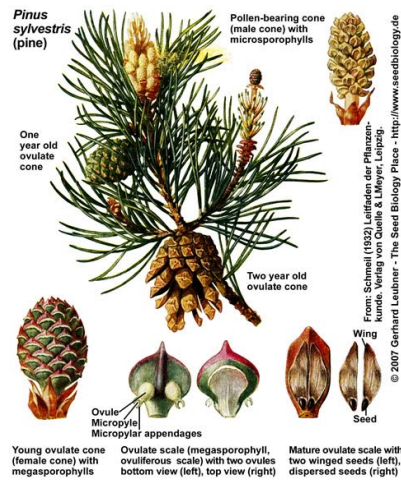


Fig. 1. Pine and its seeds [10]

Closed seeded plants are divided into single seed plants and split seed plants. This plant has true flowers and fruits.

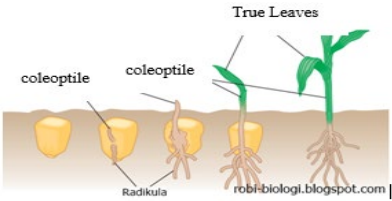


Fig. 2. Corn Plant (An Example of Single Seed Plant) [11]

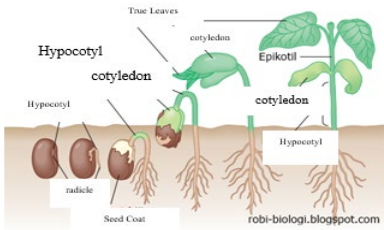


Fig. 3. Green Bean Plant (An Example of Split Seed Plants) [12]

Basic Parts of Plants.

In addition to understanding the types of plants, Early Childhood Education teachers need to understand plant parts in general and in full. It makes it easier for teachers to use plants as nature-based learning media.

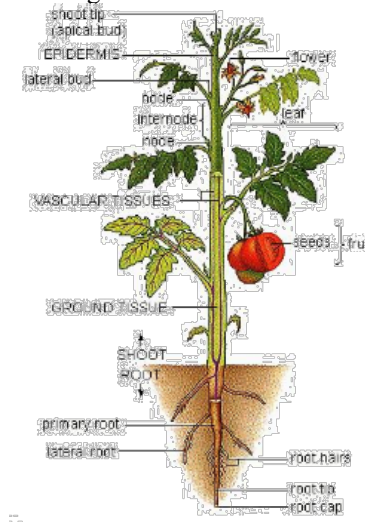


Fig. 4. A Complete Basic Parts of a Plant [13]

1. Roots

The root is the part of the plant at the bottom of the soil. Roots function as a tool to absorb saltwater and minerals as plant food. Roots are also used as a fastener for the plants' strength. Roots are divided into two, namely fibrous roots and taproots.



Fig. 5. Types of roots [14]

2. Stems

Stems function as the link between roots and leaves in which there is a transport network of xylem and phloem. They are also used as a food storage area.

3. Leaves

Leaves are plant parts attached to the stem and are green because they have chlorophyll for photosynthesis. Leaves usually have a life span where they will fall off when it is time.

4. Flowers

Flowers are parts of plants with male genitalia on the stamens and female genitalia on the pistil. Flowers are a means of plant reproduction and become the most at-

tractive part of the plant. The process of reproduction of female and male genitalia then turns flowers into fruit.

5. Fruits

Fruit is the result of female and male pollination that occurs in flowers. The fruit is the part of the plant that is usually used as a food store and has seeds. These seeds can then be used for plant regeneration.

3.4 Utilization of Plants as a Nature-Based Learning Media in Early Childhood Curriculum Themes

Myself Theme.

1. Recognizing Facial Parts

- Face Game

Facial Game is a learning game to introduce body parts, especially the face. This game constructs a child's thinking to complete the hair sections on cardboard pieces. This game introduces children to boys and girls by attaching hair from plants.



Fig. 6. Face Game [15]

The tools and materials used were various leaves, various grass flowers, used cardboard and markers and wood glue. The steps for making it are the teacher prepares a face image on the cardboard using a marker and then asks the children to hunt for grass to use as hair.

- Transparent Face Game

The transparent face game is almost similar to the face game. In this game, cardboard is developed with holes in it, and the areas where the holes are affixed are pasted using clear plastic, or to make it stiffer, use mica.



Fig. 7. Transparent Face [16]

Another difference is that in this transparent face, the child is asked to arrange the nose, eyes, and mouth pattern in the cardboard provided. From this game, the child understands the parts of the face completely.

- **Knowing Body Parts**

In this game, children know body parts are as a whole. This game requires children to understand the arrangement of body parts from head to toe. The teacher provides plants ranging from twigs, leaves, and flowers in this game. Garden stones are used as complements.



Fig. 8. Constructing Body Parts [17]

This game hones children's cognitive abilities to compose and memorize body parts, hone language skills, increase vocabulary, train motor skills in arranging body parts, and recognize God's creation, namely the human body.

My needs Theme.

My needs is a theme that represents the need for food, clothing, and shelter. This paper focused on using natural ingredients to manipulate food needs that is making ice cream. In this game, the teacher provides cotton coloured using natural ingredients as ice cream, then leaves and twigs as ice cream complements, and used paper for cones.



Fig. 9. Ice cream [16]

The abilities developed in this game are the child's imaginative ability to manipulate natural ingredients such as ice cream, learn how to buy and sell ice cream, train fine motor skills to make ice cream, and play roles as an ice-cream seller. This activity is more exciting than just pictures.

Animals Theme.

The animal theme contributes to many ideas in using plants as learning media. Introducing children to using plants in animal themes becomes more real and educational. Some examples of animal theme games using plants are as follows.

1. Fish Game

The first game is a game with a fish sub-theme. In this game, the authors give an example of two fish ponds and aquarium game activities. Fish pond games use leaf materials that do not wilt quickly, such as manga leaves or jackfruit leaves, permanent markers, scissors, and a water basin. The teacher then makes a fish pattern on the leaf and asks the child to cut it out. The fish clippings are then placed in a water basin. Here, children develop the ability to recognize fish patterns, cut simple scissors, and pretend that it is a fish that lives in a fish pond.

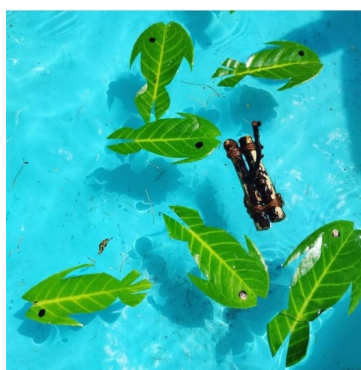


Fig. 10. Fish Pond [16]

The next activity is the aquarium. In this activity, children are asked to develop their imagination in an aquarium using natural ingredients from leaves that do not wilt easily and playdough. In this activity, the teacher develops children's imagination and creativity skills, develops vocabulary about aquariums, composes aquariums, and manipulates fish shapes with plants.



Fig. 11. Aquarium [16]

- **Hedgehog Game**

The next animal that is exemplified in this paper is making a hedgehog. The authors' exemplify two activities of playing hedgehogs with different concepts. The first is a milky hedgehog. This game uses clay, dry leaves that do not wilt easily, such as dried jackfruit leaves, dry pine leaves, and small pebbles for the eyes and nose. The game aims to construct a hedgehog animal, making a hedgehog out of clay. The benefit of this game is to ascertain how to imagine making a hedgehog either from dry leaves or dry fir.



Fig. 12. Milky Hedgehog [16]

The next game is the number hedgehog. This game uses green jackfruit leaves and dried jackfruit leaves. As a complement to this game, children may use wooden clothespins and markers to write numbers.



Fig. 13. A Number Hedgehog [16]

This activity is done by drawing the eyes and mouth of a hedgehog on a leaf and writing numbers. Now, the child's task is to pick up the leaves according to the numbers written. This game develops aspects of number recognition, fine motor skills for pinning, and language skills to count numbers.

- **Wolf Game**

This wolf game is a game in forming animal heads from natural materials, especially plants. The tools prepared to form the animal's head are leaves or grass, dried jackfruit leaves, and pebbles for the eyes and mouth.



Fig. 14. Wolf's Head [15]

The abilities developed in this wolf head game are to hone cognitive abilities to form wolf heads, children's physical motor skills to arrange wolf heads, and language skills to recognize wolf vocabularies.

- **Lion Game**

Similar to putting together a wolf's head, this game composes a lion's head. The difference is that the lion's head is combined with orange playdough and the dried jackfruit leaves are used to for the surrounding fur.



Fig. 15. Lion's Head [16]

The ability developed in making a lion's head is the child's cognitive ability to form a lion's head from playdough and dried jackfruit leaves. Fine motor skills make a lion's head, and language skills recognize a lion's vocabulary.

Plants Theme.

Plants theme also contributes a lot to the game for early childhood learning. Activities can be carried out directly by identifying plant parts in detail, such as classifying various leaf sizes, identifying young and ripe papaya fruit, etc. In this paper, the authors took two games, namely how plants drink and the growth of mung bean seeds.

The game shows how plants drink using several tools and materials. Educators must prepare white-stemmed plants (can be mustard greens), glass, water, and blue, red, yellow, and green food coloring. This game was carried out to observe the color water that rises to the leaves through the roots, which could be observed because it used white plants such as mustard greens.



Fig. 16. How Plants Drink Water [16]

The learning benefit is that children know that plants also need to eat and drink. Plants eat and drink through the roots [18]. Children also recognize primary colors such as red, yellow, green, and blue.

The next activity is to observe the growth of seeds. One of which is green bean seeds. This activity begins with children making plant pots from used mineral water bottles decorated with twigs and given eye accessories. Then, the teacher makes a hole in the pot for the water to escape if we over-water. When the pots are ready, the children are asked to fill them with compost soil and plant green bean seeds. Children can observe its growth until the plants appear like hair.



Fig. 17. Green Bean Seed Hair [16]

This activity optimizes the cognitive ability to understand plant growth. Gross motor skills can develop with the child's walking activities to pick up soil and plant and develop language skills to understand new vocabulary about plant growth.

Jobs Theme.

Jobs theme that can be done through using plants. One of them is learning how to become a chef. Children, especially girls, like it the most when playing the role of their mother cooks at home. Children can use various plant materials in presenting the form of food in their play activities.

Teachers can prepare a cooking table, or now it is popular with children's kitchens prepared with various plants ranging from leaves, flowers, and fruits. Then, the children are engaged in the role-play for the cooking activity. Preferably, the equipment used resembles the shape of an adult's kitchen, such as pan, trays, plates, glasses, etc.



Fig. 18. Children's kitchen table [19]

Children's abilities developed in this sub-theme chef can be used to develop cognitive, physical motor, language, religious and moral values, and social-emotional at the same time. Social aspects must be obtained in role-playing activities because children always play together.



Fig. 19. A kid is doing a role play as a chef [19]

1. Natural Phenomena Theme

The last theme that can be developed in learning with plants is the theme of natural phenomena. This theme was later raised in the Erupting volcanoes activity. In contrast to most erupting volcanoes made on YouTube, this game is made to look like a real mountain that is equipped with plants so that it is more attractive than just a bottle that can erupt. This game uses the same ingredients; baking soda and vinegar and red food colouring as a lava material. Of course, the lava produced by vinegar and baking soda is cold and safe for children.



Fig. 20. Erupting Volcanoes [16]

The expected abilities in this game are for the child to understand the volcano erupts. They must run away if a volcano erupts. Physical fine motor skills can be trained when trying to put vinegar in a bottle filled with baking soda and feeling the coldness due to the reaction of vinegar and baking soda. Language skills can

be seen in recognizing new vocabulary about volcanic eruptions. Several themes developed using plants cannot be developed maximally using plant media, for example, the theme of my homeland. Despite the difficulties in learning Civics, the author will continue to develop plant media in all learning themes. Plants can be used as nature-based learning media in early childhood education. Teachers need to understand various types of plants that can be utilized, such as fungi, mosses, ferns, and seed plants. Each part of the plant—roots, stems, leaves, flowers, and fruits—can be used in interactive learning activities, such as water absorption experiments, plant structure observations, and creative projects. In addition to understanding the types of plants, teachers should also recognize the basic parts of the plant (roots, stems, leaves, flowers, and fruits) to facilitate the implementation of nature-based learning in schools. Some curriculum themes that can use plants as learning media include: Self Theme: Children get to know parts of the face and body through creative play with leaves, twigs, and flowers. Needs Theme: Using natural materials for role-playing games such as making ice cream from colored cotton and leaves. Animal Theme: Using leaves and twigs to create fish, hedgehog, wolf, and lion games. Plant Theme: Experiments on how plants drink using food coloring and observing the growth of green beans. Jobs Theme: Role-playing as chefs with natural materials such as leaves and flowers. Natural Phenomena Theme: Creating volcano eruption simulations with baking soda, vinegar, and ornamental plants to make it more realistic. By applying nature-based learning strategies, children not only learn about plants, but also enhance cognitive, motor, social, and language skills in a fun and explorative atmosphere.

4 Conclusion

Early childhood learning requires a lot of innovation, this provides great benefits for children's intelligence to think holistically and systematically, in addition, teachers are required to be creative in using materials around them to carry out learning at a low cost and easy for children to understand. Plants are a source of learning that can be easily found around early childhood. Themes that can be developed in the 2013 curriculum for early childhood education using plant media are myself, my needs, plants, animals, recreation areas, and natural phenomena. In the future, with the implementation of the independent learning curriculum, the need for outdoor learning with various methods like this is very much needed.

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