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FUNCTION OF GARDENS AND GARDENING IN THE MONTESSORI EDUCATIONAL CONCEPT

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Abstract

The aim of this paper is to present a role of gardens and gardening in the Montessori educational concept. In addition to the theoretical presentation of the synthesis and analysis of the subject matter, the paper also includes the author's reflections on some extracurricular activities for children. Namely, M. Montessori's educational concept is based on anthropology (Greek: *ánthrōpos* – man + *lógos* – word, speech) and knowledge about the changing developmental stages of children's sensitivity. In Montessori schools, the classroom is an environment for children to learn and work, and the child's needs come before all needs. In some cases, adults are the biggest obstacle to a child's path to independence. School education in nature is a well-known way of learning. Classes of gardening are among subjects in Montessori school and pre-school. Staying in the garden can be treated as an extracurricular activity, which has been known since period of the Habsburg Monarchy. The paper also presents some creative possibilities for various activities of preschoolers and lower elementary school students in gardens and parks. Special attention was paid to poisonous dendrological species which should be avoided in planning and decorating gardens in kindergarten and elementary schools.

Key words: Montessori concept, gardens, gardening, preschool age, primary school children

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INTRODUCTION

The modernization process is reflected in everyday human life and its causes of life reforms are also reflected in Croatia. Pedagogical alternative education entered the door in the 1990s, although even after more than 20 years they are still in the initial phase of development (Batinić and Radeka, 2017). In our society, the media play an increasingly important role. A different development and educational process is dictated by the dynamics of life. Accordingly, teaching goals, teaching methods and didactic tools are changing in order to introduce new educational technology (Katalinič, 2007).

After several decades of a unified school and without pedagogical pluralism in Croatian pedagogy, in the last decade of the 20th century, there was an interest in alternative pedagogical education (mainly Waldorf and Montessori pedagogy) (Batinić and Radeka, 2017).

Maria Montessori (1870 - 1952) was the first Italian woman doctor, and her pedagogy was based on the philosophy of child development with aim of acquiring practical knowledge in areas of life where she will participate as an adult. It is designed in such a way as to make full use of self-motivation and the ability to self-develop and improve (Pahljina, 2018). *The processes of acquiring new knowledge are happening more and more often outside of the hitherto known didactic organizational scheme, and if it does not agree to quick adaptation, the school will lose that race* (Kovačević, 2019: 639).

In childhood, the basic potentials of neurocognitive development are developed through stimulating activities of building rich and functional neural network. This is exactly why the social environment is important (Miočić-Stošić and Lončarić, 2012: 28).

The importance of learning in nature, in field classes, for pupils and students, as well as for teachers, is already well known. Observing the environment and phenology, practical activities during fieldwork are also key in the education of Teacher Studies students (Bogut et al., 2019). Teaching in nature and the environment are already well-known ways of learning as well as teaching. They have their roots in the most important pedagogical concepts of the 17th and 18th centuries, whose ideas are still relevant today (Anđić, 2018).

Today, school gardens are both the decoration and the pride of our schools. After 1990, competitions were organized for the most beautiful school garden, and the children accepted it with joy. Let's go back in time. Since 1861, public schools have had gardening as a subject in their curriculum. Events in nature (four seasons) were followed through the school gardens (Kolar-Dimitrijević, 2014). The Montessori

concept, which will be presented in this paper, can be implemented through children's activities in school gardens.

MONTESSORI CONCEPT IN PRIMARY SCHOOLS

Maria Montessori (Figure 1) based her concept of education on anthropology (Greek: *ánthrōpos* – man + *lógos* – word, speech) *and knowledge of developmental stages in children's sensitivity, which alternate in six-year periods. "Sensitive stages", (development of speech, sense of order, coordination of movements, use of senses, language, abstract thinking, sense of morality, etc.)* (Jagrović, 2007: 67) which represent the age of a child's marked readiness to learn and appear at different times. This is precisely why children's developmental needs could not be met with face-to face teaching (Jagrović, 2007).



Figure 1. Maria Montessori (1870-1952)

(Source: https://hr.wikipedia.org/wiki/Maria_Montessori)

Montessori developed the method by direct observation of children and intuitively immersed herself in their world. Her first experiences were with intellectually handicapped children, and she applied her special method and materials, which she later checked and further developed in her kindergartens and schools. Montessori work at the school is divided into "free work" and "joint class teaching" blocks. In free work, there is either individual work or work in pairs with didactic materials, while the teacher conducts joint lessons. Sports and other activities, museum visits, etc. are organized during class time (Jagrović, 2007).

The child gains knowledge, experience and insight into living nature through play, research, observation and creative work. Directing such activities towards sharpening thought operations (Katalinič et al., 2007).

M. Montessori had been warning about the importance of motivation in work, which is related to maintaining attention on tasks. A pedagogically prepared environment and a teacher, as a working atmosphere without noise, aggression and competition, are crucial for free work. Today, the class structure in Montessori schools is different. There are three models: classes with one year, two years and four years (Jagrović, 2007).

According to the Montessori model, it is necessary to prepare the environment in which he lives and accessories that include pedagogical and didactic principles especially for the needs of the child. A significant role is played by educators who observe and value children's progress in their own development. Special attention is paid to children with special and developmental needs (http://www.hrmdrustvo.hr/montessori_pedagogija.html).

In Montessori schools, the classroom is a specially designed environment for learning, working and meeting the developmental needs of children. Montessori materials are practically used for developing movement and sensory abilities, language and mathematics, etc. The equipment for a particular exercise is always in the same shape, in the same place and arranged in the same sequence. The materials are used for individual acquisition of experience, so intellectual and physical abilities are developed. The classroom is decorated with plants, written works, pictures and drawings (Jagrović, 2007).

TEACHERS, PARENTS AND ASSESSMENT

In her pedagogical concept, Maria Montessori emphasizes the meaning of the teacher's personality. The educator must be tactile and leave the activity to the child. When the child becomes active, the teacher should be passive, but also pay close attention. In Montessori schools, the teacher leads the class with the help of an assistant for two or four years. The class teacher supervises the free work of the students, while the professional classes are led by subject teachers. Student results are evaluated according to the child's capabilities and individual characteristics. When evaluating and planning their own activities, the child also participates, which also depends on his maturity. The needs of a developing child should come before all needs, and parents should support and understand them and cooperate with teachers. Teachers to work in Montessori schools should be trained in Montessori pedagogy (Jagrović, 2007).

In some cases, adults are the child's biggest obstacle in independence, and because of this, according to the principles of Montessori pedagogy, the child can realize his potential. Parents and teachers should not hinder his development, but encourage it. An environment adapted to him allows the child the freedom to act and explore (Bašić, 2011).

MONTESSORI CONCEPT IN PRESCHOOL INSTITUTIONS

Maria Montessori's pedagogy is based on observing the child's spontaneous learning and encouraging his/her actions while respecting the child's personality (Philipps, 2003, according to Balala, 2011). In order for a child to achieve independence, responsibility and help others, it is necessary to enable him to carry out small tasks and take on certain obligations. For "exercises for practical life" During all actions, the educator pays attention to details. As an educator, the child should be made aware of everything the child does (Montessori, 1969, according to Balala, 2021).

According to Marija Montessori, raising children means helping the child to become a human being (Batistič Zorec, 2003, according to Valjan Vukić, 2012). Montessori emphasized the relationship between the child and his environment, with attention to a wellprepared environment and the selection of materials to meet the child's needs and interests. In her pedagogical concept, the prepared environment plays a significant role in the realization of educational goals (Valjan Vukić, 2012).

Thus, the child develops, learns and progresses in interaction with the environment. In the right environment with materials and accessories, positive communication with peers develops and creates a stimulating atmosphere (Valjan Vukić, 2012, according to Matičević, 2021).

Children explore their own possibilities when they engage in exploratory activities and test their abilities. Using their own previous knowledge and understanding, they explore different concepts of interest. The kindergarten environment is actually a children's laboratory for various research endeavors aimed at solving problems and constructing independent knowledge (Slunjski, 2012).

Through the children's stay in preschool institutions, educator observes children's interest by and document them, and , organizes research and cognitive activities (Vujičić, 2016).

ENVIRONMENTAL EDUCATION

Environmental education is an increasingly important area in our lives. In education for the environment, it is important to know its essence, its reach, and to be aware of its complexity and breadth. Since the relationship of people to the environment is

increasingly a human existential issue focused on nature and society, a correct understanding of environmental education and its inclusion in the educational process is necessary. Education in environment requires a different understanding of the individual and the use of knowledge. Children and students learn the world with sight, hearing, smell, taste, and touch (Katalinič, 2008). The educational process should challenge the child's inner possibilities with different activities in a certain natural environment (Valjan Vukić, 2012).

Thus, for example, with the help of a sensory garden, children can develop their own skills in nature and learn about flowers, growing vegetables, fruits, etc. For Montessori pedagogy, the external stimulating environment is the forest, olive groves, squares, parks, i.e. all places where children of kindergarten age can spontaneously learn. Although this environment is not prepared in advance, it is stimulating for children (Valjan Vukić, 2012, according to Matičević 2021). Most educational institutions according to the Montessori program have gardens (Table 1).

Table 1. Some of the activities in Montessori kindergartens

Name of kindergarten	Activity in garden	Sources
DV MARJAN Split	<i>The building in which we are located has a spacious yard with a garden where children and educators contribute to sustainable development and positive impacts on the environment and quality of life through continuous activities throughout the year, tilling the soil, planting plants and maintaining the garden. Children are happy to participate in garden maintenance activities, digging, planting, watering, following every phase of plant growth and development, and then reaping the the fruits of their hard work.</i>	https://vrtic-marjan.hr/montessori-program/
Sunčev sjaj-Nazret Đakovo	<i>Small gardens make it possible to directly experience actions typical of this region, such as tilling the soil, sowing, planting, plant care, harvesting fruits and storing them.</i>	https://www.montessori-nazaret.com/o-nama/
Dječji vrtić Vjeverica Zagreb	<i>Far from noisy roads, in the northern part of the city, at the foot of Medvednica, surrounded by greenery, clean air, with a Japanese garden and a waterfall,</i>	https://vrtic-vjeverica.zagreb.hr/default.aspx?id=62

	<i>we love and nurture a healthy lifestyle for children and adults. Kindergarten Vjeverica has four locations. The central building is the work of the famous architect, prof. Boris Magaš, built in 1974.</i>	
Dječji vrtić Bukovac Zagreb	<i>In cooperation with the parents of both groups, children planted a garden, which this year is located on the terrace of the kindergarten. We cleared the garden of last season's plants and grass and planted flowers, perennials and strawberries. We planted vegetables, such as beans, tomatoes, lettuce and onions, in pots that we keep in the living room, and when it warms up, we will transplant them into the garden. We water the plants in the garden and in the room every day and observe their growth.</i>	https://vrtic-bukovac.zagreb.hr/default.aspx?id=6

Below is given (Tables 2 and 3) a possible activity plan for kindergarten and elementary school children in the garden/park according to the Montessori concept.

Table 2. Kindergarten children's activities in the garden/park

Activities in the garden/park Age: 3-4 years	Activities in the garden/park Age: 5-6 years
Tillage -Practical demonstration exercises in soil cultivation	Tillage -Practical demonstration exercises in tillage -Crop rotation, pests and weeds in the soil -Pulling perennial and rhizome weeds -Leveling the ground with suitable tools
Plant fertilization -Practical demonstration exercises in plant fertilization -Help with the production of botanical fertilizers -Demonstration exercises on making compost	Plant fertilization -Practical demonstration exercises in plant fertilization -Fertilization of smaller vegetable and flower beds with organic fertilizers -Production of botanical fertilizers -Creation of a compost site and cultivation of California earthworms with assistance
Sowing -Practical demonstration exercises in sowing -Sowing vegetables and flowers in pots	Sowing -Practical demonstration exercises in sowing - Identification of seeds -Sowing vegetables and flowers in pots and beds

Planting -Practical demonstration exercises in planting different plants -Planting vegetable and flower seedlings	Planting -Practical demonstration exercises in planting different plants -Planting vegetable and flower seedlings
Harvest -Practical demonstrations of fruit and vegetable harvesting - Harvesting fruits with assistance	Harvest -Practical demonstrations of fruit and vegetable harvesting -Follow-up of technological maturity dates with assistance -Harvesting fruits with assistance
Plant growth and development -Monitoring the growth and development of plants -Watering during growth and development, potted species -Teaching about plant diseases and pests.	Plant growth and development -Monitoring the growth and development of plants -Identification of species in the cotyledon phase -Teaching about nutrition and care during growth -Pruning, practical examples and minor interventions under the supervision of an educator/assistant -Teaching about plant diseases and pests, ecological methods of controlling diseases and pests
Other activities -Garden/park drawing -Drawing of individual plants	Other activities -Garden/park drawing -Drawing of individual plants -Help with making garden technical elements -Pressing of plant material and creation of herbarium with assistance -Education on plant biodiversity and the function of plants in the city

Table 3. Activities of children from grades 1-4 of elementary school in the garden/park

Activities in the garden/park Age: 7-8 years (1 and 2 class)	Activities in the garden/park Age: 9-10 years (3 and 4 class)
Tillage -Practical demonstration exercises in tillage -Crop rotation, pests and weeds in the soil -Pulling perennial and rhizome weeds -Leveling the ground with suitable tools	Tillage -Practical demonstration exercises in tillage -Crop rotation, pests and weeds in the soil, higher level -Pulling perennial and rhizome weeds -Leveling the ground with suitable tools
Plant fertilization Practical demonstration exercises in soil fertilization -Fertilization of smaller vegetable and flower beds with organic fertilizers -Production of botanical fertilizers -Creation of a compost site and cultivation of California earthworms with assistance	Plant fertilization -Practical demonstration exercises of tillage -Fertilization of vegetable and flower beds with organic fertilizers -Production of botanical fertilizers, higher level -Creation of a compost site and cultivation of California earthworms with assistance
Sowing -Practical demonstration exercises in sowing	Sowing -Practical demonstration exercises in sowing

-Identification of seeds -Sowing vegetables and flowers in pots and beds	-Seed recognition, higher level -Sowing vegetables and flowers in pots and beds
Planting -Practical demonstration exercises in planting different plants -Planting vegetable and flower seedlings	Planting -Practical demonstration exercises in planting different plants -Planting vegetable and flower seedlings, higher level
Harvest -Practical demonstrations of fruit and vegetable harvesting -Follow-up of technological maturity dates with assistance -Picking fruits	Harvest -Practical demonstrations of fruit and vegetable harvesting -Monitoring technological maturity dates with assistance, higher level -Harvesting and storage of fruits
Plant growth and development -Monitoring the growth and development of plants (notes) -Identification of species in the cotyledon stage, higher level -Teaching about nutrition and care during growth -Pruning, practical examples and minor interventions under the supervision of an educator/assistant -Teaching about plant diseases and pests, ecological methods of controlling diseases and pests with assistance	Plant growth and development -Monitoring the growth and development of plants (notes) -Identification of species in the cotyledon stage, higher level -Teaching about nutrition and care during growth, higher level -Pruning, practical examples and minor interventions under the supervision of an educator/assistant -Teaching about plant diseases and pests, ecological methods of controlling diseases and pests with assistance, higher level
Other activities -Garden/park drawing -Drawing of individual plants -Help with making garden technical elements -Pressing of plant material and creation of herbarium with assistance -Education on plant biodiversity and the function of plants in the city	Other activities -Garden/park drawing -Drawing of individual plants, higher level, different techniques -Measurement of the garden of the park -Help with making garden technical elements -Creation of herbarium -Hortitherapy and education on plant biodiversity and the function of plants in the city, practical examples

Tables 2 and 3 show the plan of various gardening activities and stay in the garden o for children of preschool and lower elementary school age. The main activities are the same for all groups with differences in some sub-activities. In the preschool age, children aged 5-6 receive more emphasis on practical work in the garden compared to the younger age, where demonstration exercises and theoretical basics are practiced more. For older elementary school students, in addition to practical work, monitoring and research of individual stages in plant cultivation is preferred. In addition to the above, children, with the acquired theoretical and practical knowledge in the field of gardening, become more creative, more resourceful, improve their social relationships and self-confidence, physical activity, etc.

Thus, Farkaš (2003), according to Ament (2016), points out that children gladly accept various ecological activities and workshops, along with their suggestions for future activities, and the value of this kind of work has been shown in the application and manifestation of children's knowledge in the family environment. The results of individual research, Marinić (2018) indicate that the participation of children from kindergartens in environmental programs significantly affects knowledge importance of horticulture and the impact on the quality of life. Along with expert knowledge of horticulture, children from the ecological group had a higher level of awareness in terms of ecology, care for the preservation of the environment, social empathy and knowledge about quality nutrition.

It is known from pedagogical practice that: *once they overcome their initial impatience, children can be very dedicated gardeners. They will sow the seed, and the next day they will most likely dig it up to see if it has germinated. But if you encourage them to experiment with climbers that grow very quickly and become beautiful and lush plants, children will be captivated by the mystery and excitement of the plant world* (Wickham, 1990: 222).

In Montessori institutions, educators and teachers observe and direct children towards the area that particularly interests and preoccupies them. Gardening for children with special needs improves motor skills, increases creativity, social relationships and affects self-esteem, also reduces stress and helps children better cope with anxiety and frustration. History tells us that the involvement of children in the cultivation of plants was part of the educational system in the Habsburg, that is, the Austro-Hungarian monarchy, from organized schooling in the period of Empress Maria Theresa until 1918 (Kolar-Dimitrijević, 2014).

According to Kostović Vranješ (2013: 11), *knowledge of natural history directly contributes to the overall progress of modern man, enables him to adapt to the rapid development of science, technique and technology, and gives him the basis for responsible action towards his health, his natural and social environment.*

A stay in the garden can be treated as an extracurricular lesson. According to the methodical purpose, it can be: introductory, illustrative, research, mixed, collection, and according to the methodical sequence as: synthetic, analytical, comparative, analytical-synthetic, etc. In teaching practice, this form of teaching lasts from one to two school hours and extracurricular spaces or in the immediate vicinity of the school (Kostović-Vranješ, 2015).

In addition to the standard ones used, ornamental, fruit, aromatic and vegetable crops have always been part of the ornamental garden. They give the garden the characteristics of casualness, and at the same time they are useful and decorative if they are properly shaped into the garden area. They can be used for different beds and

pots. Some of them are: onion, leek, cabbage, cauliflower, broccoli, tomato, pepper, eggplant, cucumber, zucchini, lettuce, carrots, parsley, celery, beans, spinach, chard, etc.) (Dorbić et al., 2020).

When planning and decorating kindergartens and schools, it is necessary to avoid poisonous dendrological species, and some of them (selected elementary schools in the coastal part of Šibenik-knin County) are: ivy (*Hedera helix* L.), oleander (*Nerium oleander* L.), boxwood (*Buxus sempervirens* L.), water lily (*Viburnum tinus* L.), viburnum (*Ligustrum vulgare* L.), laurel cherry (*Prunus laurocerasus* L.) and others (Pandža, 2016). In the area of Zadar, according to research by Perinčić et al. (2010) the most common poisonous species are *Viburnum tinus*, represented in seven localities (five schools and two kindergartens) and *Nerium oleander* in six localities (4 schools and two kindergartens). The same authors state that when designing and decorating schoolyards and kindergartens, preference is given to choosing species that are not toxic, allergenic or thorny, in this case decorativeness and design come second. According to research by Vlahović and Karlović (2013), certain poisonous species were also recorded in selected school gardens in the continental part of Croatia: holly (*Ilex aquifolium* L.), ivy (*Hedera helix* L.), yew (*Taxus baccata* L.), savin (*Juniperus sabina* L.) etc.

Figure 2. *Taxus baccata*



(Photo: B. Dorbić)

Figure 3. *Nerium oleander*



(Photo: B. Dorbić)

CONCLUSION

Today's dynamic of living shapes different development and educational process. teaching methods and goals are changed. at Montessori schools, in classroom, created environment for children to learn and work. Montessori materials have educational value. The founder of this educational method, Maria Montessori, emphasizes importance of the teacher's personality in her pedagogical concept, and the child also participates in the evaluation and planning of their own activities. The child's needs should come first. Raising children, according to Maria Montessori, means helping children in shaping as human being. The child developing progress and Education with interaction with environment. Gardening can be very useful in Montessori pedagogy, for example, with the help of a sensory garden, children can develop their own skills in nature and learn about garden plants. Spending time in the garden can be treated as an extracurricular activity, and it has been known since the reign of the Habsburg Monarchy. The paper also presents some activities of preschool children and lower elementary school students in the garden/park of the educational institution. The main activities are similar for all groups with little differences in some sub-activities. Namely, it is known that children are happy to accept various ecological activities and workshops. Gardening for children with special needs improves motor and other skills.

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