



Observation - Applied in the Wild Garden for Students' Knowledge of Nature

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Abstract

The aim of the research presented in this article was to show the possibility of using observation in outdoor activities with primary school students. The wild garden in the schoolyard, regardless of its area, is an ideal place for students to study plants and animals. From the wide range of methods that students can use to study living organisms, the teacher can choose observation. This allows them to identify characteristic features of some plant or animal organisms at a particular stage of their development. They can also record the changes that take place in the appearance of plants or animals in response to certain environmental factors over several weeks, months, or even over a calendar year. The proposed activity models based on the application of observation have shown the possibility of using this method in wild garden activities.

Key words: Formal activities; non-formal activities; observation; primary education; wild garden

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1. Introduction

In the project entitled *Wild, The wild garden for learning and development* (<https://www.wildgardenschool.eu/>), participating schools were proposed to create wild gardens in which to work with students. Thus, in Pitești, at Alexandru Davila Secondary School, such an ecosystem was created by teachers and students in the schoolyard. Numerous species of grass plants, shrubs and trees were sown or planted. The way the plants were distributed in the schoolyard was random to create the wildest possible green space. Among the herbaceous plants you can admire, we mention the following: aster novi (*Aster novi belgii*), iris (*Iris* spp.), veronica (*Veronica* spp.), honeysuckle (*Lonicera caprifolium*), strawberry (*Fragaria viridis*), lavender (*Lavandula* spp.), salvia (*Salvia* spp.), white water lily (*Nymphaea alba*), forget-me-not (*Myosotis* spp.), verbena (*Verbena* spp.). Shrubs were planted such as: horn (*Cornus mas*), rose hip (*Rosa canina*), elderberry (*Sambucus nigra*), blackberry (*Rubus* spp.), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), wild privet (*Ligustrum vulgare*), hazelnut (*Corylus avellana*) and bay (*Laurus nobilis*). Aromatic plants such as basil (*Ocimum basilicum*), rosemary (*Rosmarinus officinalis*), oregano (*Origanum vulgare*), thyme (*Thymus* spp.), and mint (*Mentha* spp.) were sown in layers for students to smell. Silver fir (*Abies alba*), yew (*Taxus baccata*), thuja (*Thuja orientalis*), and willow (*Salix alba*) are the tree species selected for planting in the wild garden. The colourful flowers of these plants, which bloom in different months of the year, will provide food for insects, and the fruits of some shrubs will provide food for the birds that will visit this wonderful garden. To avoid destroying the lawn during activities with the students, the avenues in the garden were constructed of split logs placed slightly above the ground from place to place. A pond was made to study aquatic plants and some amphibians. Various types of birdhouses were installed in the trees to provide shelter and food for the birds when conditions were unfavourable, as well as to observe them.

Most schools around the world have a garden where different types of plants exist or can be grown for students to study. For example, the pollinator garden can be created in the schoolyard when native plant species are sown or planted to attract different pollinating insects such as butterflies and bees (Swihart, 2020). Food garden is another type of garden where plant species that are food for humans can be sown or planted. It can be planted with the goal of teaching students how to grow plants that are considered healthy foods and incorporate them into their diets (Dyer, 2020). Wild botanical gardens created in urban areas or botanical gardens in Latin America offer the opportunity to develop environmental education programmes, as Suárez-López & Eugenio (2018) mention. The authors emphasise their importance for society to develop responsibility for nature. The importance of school garden activities is underlined by Malberg Dyg and Wistoft (2018), who estimate, based on numerous case studies, that self-esteem is positively affected in most pupils and empathy for plants and animals develops.

The main teaching method that ensures students' direct contact with the environment is observation. Through it, students can understand the mysteries of living organisms and acquire the knowledge about them. In their observations, students can use the main senses: the sense of sight (for example, to identify an organism, determine its shape, colour and size), the sense of hearing (to identify a bird by its song), the sense of taste (to determine the flavour of a fruit), the sense of smell (to identify a plant by the smell of its flower), the sense of touch (to determine whether its surface is smooth or rough) and the sense of heat (to determine whether an organism is warm or cold). As can be seen from the above, and in full agreement with Cerghit's (2006) comments, observation can be said to contribute to "multimodal perception that occurs through multiple sensory channels". Thus, "it provides the student with a science from experience rather than one already received" (Ureche & Ureche, 2012). Observation as a teaching method is successfully used in classroom activities to investigate the environment, regardless of the age of the children, students, or pupils. Whenever the teacher draws the students' attention to the aspects

to be observed, both in the classroom and outdoors, through conversation or with the help of worksheets, then they will achieve the desired results and reach the previously proposed goals. Ciolac-Russu (1983) estimates that the method has a "special value for the exploration and discovery of the living world by the students". It can be said that it is "the main method that provides immediate access to knowledge and exploration of the environment" (Fătu *et al.*, 2008; Petruța, 2017b). Thus, students have the opportunity to learn about "some essential features" of organisms, processes and phenomena in nature (Todor, Bărbuleanu & Burtea, 1988; Petruța, 2017b).

The importance of this active-participative method has been emphasized since the first half of the twentieth century by the then teachers Moisilu, Kirițescu & Simionescu (cited by Petruța, 2005; Petruța, 2017; Petruța, 2019). Currently, Romanian pedagogy and didactics books mention several forms of observation, depending on different classification criteria such as: Place, duration, degree of guidance, form of organization of the student activity, expected results, etc. We mention here only the opinion of Iancu Ciobanu (2009), who makes a classification of observation forms considering the "nature of the teaching material" and exemplifies the possibility of using observation in teaching biology in middle and high school. At the same time, specialists repeatedly emphasize the richness of the formative effect of the method (Măță, 2010), which is not only intuitive, but also partly intellectual-rational, and its application gradually generates "the transition of the student from spontaneous / guided observation to organized / independent observation" (Cojocariu, 2004).

Ahtee *et al.* (2009) distinguish between spontaneous and scientific observation. The first form of observation can be done anytime and anywhere and refers to the fact of "looking at things", while the second form of observation is carried out by students to acquire scientific knowledge. Scientific observation can be a simple or complex activity "if it is used to develop further explanations and theories about observed phenomena".

In order to carry out the applied research, we considered the following questions:

- How can observation be applied in classroom activities for the study of some plants in the wild garden of primary school students, given the ideas of biology they have to learn at this age, according to the provisions of the approved curricula and textbooks of the Ministry of National Education?
- How can primary school students understand and learn about some animals in the wild garden through observation, given the above considerations?

The aim of the research was to highlight the possibility of applying observation in formal and non-formal activities carried out in the wild garden, in order to study plant and animal organisms by primary school students. The objectives were the following: highlighting the way in which observation can be used, in different forms, to understand and acquire notions about certain species of grassy and woody plants existing in the wild garden, by primary school students; emphasize how some species of animals in the wild garden can be studied by primary school students through the method of observation. To achieve the proposed objectives, we used curriculum document analysis as a research method. Thus, we considered the content of the curriculum and textbooks for mathematics and environmental exploration developed for the first three grades of elementary school in relation to the specific skills related to plant and animal organisms that students should achieve, the level of knowledge about these living things that students should acquire, and the proposal of using observation as a didactic method. Next, from the same point of view, we considered the science curriculum and textbooks for 3rd and 4th grades.

2. An innovative project - The Wild Garden for Learning and Development

According to the regulations in force, the competences to be developed by pupils in primary school and what they learn about plants and animals through the method of observation must be consistent with the content of the curricula and alternative textbooks for mathematics and exploration of the environment and natural sciences, respectively. In terms of what students should be able to do in the first three grades, the focus shifts from describing aspects of nature to "problem solving," first through observations, and later through observations and generalizations (Ministry of Education, 2013). In 3rd grade, they need to be able to name the characteristic features of organisms and conduct an investigation according to a given plan (Ministry of Education, 2014). In the next grade, they must know how to recognize the relationships between organisms through observation and conduct an investigation according to their own plan (Ministry of Education, 2014).

In the contents of the above curricula, it is stated that different teaching methods are used so that students can understand and acquire the concepts of science. In a previous article, which we wrote following the analysis of curriculum documents from the point of view of the use of observation, practical work and laboratory experiments in elementary education for the education of students in the concepts of science, we found that according to the curricula, "observation is recommended for learning activities from the preparatory class to the 4th grade" (Petruța, 2017b). This method is also recommended in the content of textbooks, "especially in the preparatory class and in the 1st to 2nd grade". In the current study, considering only the recommendations of the school curriculum for the subject of mathematics and exploration of the environment in relation to the application of observation for the study of plant and animal organisms, students in the preparatory class will observe some changes that occur in the life of these organisms in different seasons, they will observe the living environment of some plants or animals (e.g. insects), they will identify their components through observation, they will follow the growth of a seedling taking into account an environmental factor, etc. (Ministry of Education, 2013).

In 1st grade, they identify the main components that make up the body of plants and animals through observation (Ministry of Education, 2013). In 2nd grade, they identify plants and animals during an investigation of a natural (pond, forest, etc.) or artificial (aquarium, park, etc.) habitat. They also observe the living conditions and adaptations of animals to the environment in which they live (Ministry of Education, 2013). During the investigation, observation is used as a didactic procedure. In 3rd grade, according to the science curriculum, students will observe some plant and animal organisms to identify their components and certain characteristics. They will also make repeated or long-term observations on a particular aspect of a plant (MEN, 2014). In 4th grade, they will study specific stages in the life cycle of a plant, making regular observations of the aspect they are studying (Ministry of Education, 2014).

Given the aspects analyzed above, in the project entitled Wild! The Wild Garden for Learning and Development (<https://www.wildgardenschool.eu/>), in IO02 Teach in the Wild Garden, in Chapter 2 The Pedagogy of Nature, the subchapter 2.2. Appropriate teaching methods for activities with ecosystems designed and maintained by students, in which I highlighted the possibility of using multiple methods, including observation (Petruța, 2021). Most of the outdoor activities will be able to be carried out with a small group of students, including students with special needs. During the proposed classroom activities, students will conduct short- or long-term observations of some of the plant and animal species found in this garden.

The model of the didactic activity entitled *Spring / summer / autumn scent in the wild garden*, offers the teacher the possibility to choose its name depending on the season in which the observation of the existing plants in the garden is made. Also, the teacher will choose the option of carrying out the activity, depending on the age of the students involved in the observation activity. Thus, for 1st and 2nd class we proposed activity variants for one or two flowering plants.

The activity variant for 3rd and 4th grade suggests observing several flowering plants. All proposed activity variants are accompanied by worksheets. Thus, the youngest students will correctly identify and name the flowering plant / plants, specify the stage of development of the plant, and then mention the characteristics of their components, some of which can be established with the help of senses (sight, smell). A short observation will be made. Older students will make a long-term observation and analyse more flowering plants. They will mention their popular name and determine the type of plant observed (grassy or woody). Then, they will write in the worksheet the characteristics of the parts of the plant observed above the ground and in the soil (color, shape, appearance and smell).

Observations are made with the naked eye and with the aid of a magnifying glass. On this occasion, students may be asked to make generalizations based on the observations made. In order not to destroy the lawn and to be able to carry out the observation of the plants properly, a group of 8 -12 students can participate in the activity, working individually or in pairs. The proposed model can be carried out in the form of a formal or non-formal activity with the structure IN / OUT / IN (<https://www.wildgardenschool.eu/>). Through the activities carried out in the wild garden, students will develop their attention, spirit of observation, language, cooperation and general culture. The knowledge about plants previously acquired by the students can be consolidated and enriched as they can observe other types of plants in addition to those in the textbooks.

For example, in Grade 1, on the occasion of studying the functions of plant organs in the above-mentioned curriculum documents, the following examples are given: tomato and cucumber (Pițilă & Mihăilescu, 2018a) or tomato and pear tree (Bălan *et al.*, 2018). The didactic activity model entitled Are all plants non-perennial? envisages a long-term observation (4-5 months) in which students measure the growth of the observed plant over a period of time with a ruler and indicate the date of appearance of certain organs during the development of the observed plant. Students record the results of the observations on the worksheets. This can be done in the form of a non-formal activity. And in this case I have suggested three variants, where the teacher has the opportunity to choose how to carry out the observations.

The teacher has the option to choose the types of annual or perennial plants that the students should observe. In the first option, the activity is conducted in the classroom and in the wildlife garden, with the teacher sowing seeds of the same perennial species. Students work in pairs to find out the name of the species when it flowers. The second variation involves observation in the classroom and in the wild garden. The teacher selects different plant species to be analyzed by the pairs of students. In the third suggested variation, the observation will take place only in the wild garden. Most student pairs will observe the growth and development of various species of grassy and woody plants. The exception is two pairs who will follow the life cycle of the same species sown in pots and in the soil of the wild garden (<https://www.wildgardenschool.eu/>). The data collected by students following their own observation activity can be used in the lessons in the 2nd grade, when they will study about plant life (Pițilă & Mihăilescu, 2018b).

In the 4th grade, the teacher can ask students to remember the observations made earlier, when they will analyze the images in the textbook regarding the life cycle of plants. For example, it will be possible to make a comparison between the different stages that a plant goes through, from the seed stage until it dies, given an aromatic plant or a shrub / tree observed in the wildgarden and certain plant species exemplified in the manual. Among these we mention the following: tulip, onion, bean, dandelion, quince, etc. (Pițilă & Mihăilescu, 2021). Short-term observation of some species of animals, for example, the earthworm can be done according to the model of didactic activity *Wild garden animals*, in a formal or non-formal activity with the structure OUT / IN. By completing the proposed worksheet, students will highlight the living environment of the

observed animal, the composition of the body of the observed species with the naked eye and the magnifying glass and certain features of its sensitivity and movement (<https://www.wildgardenschool.eu/>).

The observations made by the students about the earthworm's adaptation to underground habitat can be revisited in 4th grade when they examine the animals' adaptation to different habitats. For example, it will be possible to make a comparison between the earthworm and the mole, both of which live in the same environment (Pițilă & Mihăilescu, 2021). Long-term observation of sedentary or migratory birds visiting the wild garden in search of food can be carried out over a longer period (7 months) in the form of a non-formal activity by choosing the Trills in wild garden activity model. Thus, over a period of several months (7 months), students will identify certain species of birds, correctly name their vernacular name, and describe the smell of bird feathers on their head, boot, tail, and wings. All of this data is recorded on the worksheet handed out. Students can use the zoological atlases (<https://www.wildgardenschool.eu/>) to check for accuracy. Students have been familiar with migratory birds since kindergarten when they studied swallows and storks. During the elementary school lessons, this knowledge is deepened and contributes to the formation in the students of the concept of the migratory bird and, later, of the bird. The observations collected by the curious, patient students who participate in the application of this activity model can be used in the classroom whenever the topic is the adaptation of animals to the existing living conditions in the environments in which they live or migration. As a curiosity, the data on bottles noted by the students can be used in the 4th grade when talking about the stork as a migratory bird (Pițilă & Mihăilescu, 2021).

Conclusions

The wild garden is a wonderful place to teach students because of the variety of plant and animal species that can inhabit it. Formal and non-formal activities can be carried out here to arouse students' curiosity, stimulate their attention and spirit of observation, while helping them to understand the concepts they are learning about plant and animal organisms. To do this, the teacher can use many methods, including observation in the form of short- and long-term observations.

In the project entitled Wild, The Wild Garden for Learning and Development (<https://www.wildgardenschool.eu/>), students, under the guidance of the teacher, identified plant species found in the wild garden (e.g., aromatic plants), named them correctly, determined their components based on observations made, described the plants observed, highlighted their characteristics, and tracked their growth and development over a period of time. Some children with disabilities were also involved in the observations, with work tasks adapted to their abilities. Students also observed specific animal species: Insects (e.g. bees, bumblebees), but also birds that visited the wild garden in search of food (e.g. sparrow, stork). They determined the individual parts and their colour. The complexity of the students' work tasks corresponded to the age of the students who participated in the formal and non-formal activities carried out, as well as to the provisions of the current curriculum documents.

From the above, it can be seen that the aim of the research was achieved. Observation as a teaching method can be used in the wildlife garden activities to investigate the plant and animal organisms by the students. The research objectives have also been achieved. Thus, the models of the didactic activities I used in the project entitled Wild! The wild garden for learning and development (<https://www.wildgardenschool.eu/>) proposed the possibility of using short and long term observation in the activities carried out with the students in the wild garden, so that they understand and learn about some plant and animal species. This can be a real support for teachers working with pupils in primary schools.

The wild garden created at Alexandru Davila Secondary School in Pitești is the result of a unique project in the country, and the teaching activities that students can carry out in this ecosystem are unprecedented.

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