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DIRECT LEARNING ABOUT NATURE IN 6-YEAR-OLD CHILDREN LIVING IN URBAN AND RURAL ENVIRONMENTS AND THE LEVEL OF THEIR KNOWLEDGE AND SKILLS

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Abstract. *The contemporary theory of learning treats pre-school instruction as the first level of early child education. The pre-school age is seen as a very important period of life. A pre-school child grasps knowledge spontaneously, naturally, in all circumstances, thus, direct learning seems to be of particular importance. It may therefore seem that children living in the village have more stimuli for direct learning about nature, developing their knowledge and skills. However, children living in the city have more access to different amenities and financial resources to develop their talents and interests. The following studies have been conducted to determine whether there is a difference in the knowledge and skills about nature in 6-year-old children regarding the place of residence. The research covered 50 children in the city and 40 children in the village. The examination consisted of two stages: the pre-test and post-test. There were used age-appropriate flash cards. During 6 months, teachers systematically introduced a direct learning project on nature in four ecosystems: a meadow, a park, a forest, a zoo. The analysis of the data gathered in the research showed that direct cognition has an impact on increasing children's knowledge and skills.*

Key words: *direct learning, children in 6-year-old, urban and rural environments, developing knowledge and skills.*

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Introduction

Children begin to learn about nature very early. It can even be said that they do it before they learn to walk. At the same time, learning about nature in a targeted and conscious way begins in kindergarten. The person who plays the most significant role in the process is the pre-school education teacher. S/he is responsible for organizing the didactic process and shaping positive attitudes by planning and implementing different forms of classes, learning methods, choosing the proper natural environments to meet the age requirements as well as children's intellectual predispositions and age-specific interests.

Kindergarten can wield a multilateral influence on children's development by organizing their time while staying there. However, the effects of this work require considering the children's developmental characteristics as being active subjects of the upbringing processes. Thus, kindergarten is obliged to boost and shape children's progress properly. It is a teacher who supports children's efforts and responds to their initiatives, assists whenever help is needed, stirs to action, provides explanations, teaches. While doing all these, the contents of games are diversified, there are introduced new types of them to shape social and moral attitudes and to enrich the children's devices to create plastic art pictures. The specificity of the upbringing processes in kindergarten makes the learning processes go simultaneously. The two processes are integrated to a great extent. The learning content is not a separate unit but it is included in the upbringing process. Every situation connected with a child who spends time at the given kindergarten, no matter if it is self-service, playing games, various activities and forms of work, influences the child's personality and has its upbringing nature. There are included many learning contents which are connected with the whole system of work devoted to upbringing. Thus, the learning process accompanies every situation connected with a child in kindergarten. Learning can be distinguished in this process and it means gaining knowledge by children about the world, getting to know new terms and abilities. Learning in kindergarten is interrelated with action. During this period it is mainly associated with circumstantial and subcon-

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scious learning, unintended both by children and adults. In the process of upbringing children also learn with the teacher's guidance. The learning process covers practical abilities useful in everyday life, thanks to which children gradually become unassisted, but it also covers learning contents included in the upbringing program of the given kindergarten. Both the process of learning and the upbringing process are carried out thanks to forms and methods accepted by the kindergarten pedagogy.

Methods acknowledged by the kindergarten pedagogy extend over both upbringing and learning processes and take into consideration properties and progress stages of a child. While working with kindergarten children there are used methods which are based on actions (active methods: the method of independent experiences, the method of guiding a child's own activity, the method of tasks directed to a child, the method of exercises), methods based on observation (view methods: observation and demonstration, the personal example of a teacher, making fine arts available) and methods based on words (verbal methods: conversations, short stories, riddles, descriptions and instructions, ways of social communication, methods of the vivid word).

Specialists believe that the most effective way for a child to get to know nature is his/her direct contact with the natural environment. Through direct contact with nature, s/he receives a multitude of stimuli that affect the brain's neurons. Further, the child experiences positive emotions such as joy, curiosity, surprise, which help the learning process. By observing and experiencing nature directly, the child is more prone to ask numerous questions and try to find answers to them. The presented approach of learning by observing nature is the basis of new concepts such as self-directed learning and shaping natural-born abilities in pre-school children (Robbins, 2009; Ntalakoura, Ravanis, 2016; Żuchelkowska, 2015).

Many specialists have drawn their attention to appropriate selection of learning methods in the learning process meant for children aged 5 to 6 (Kampeza, Vellopoulou, Fragkiadaki & Ravanis, 2016; Gallegos-Cázares, Flores-Camacho & Calderón-Canales, 2009, Żuchelkowska, 2015, Seker, 2008). They stressed the importance of the holistic approach in the pre-school children's education (those aged 3-6 years). As far as education about nature is concerned, such an approach is fully justified as it concerns the curriculum, goals and learning methods as well as shaping positive attitudes (Fleer, 2002; Robbins, 2009; Sikder & Fleer, 2015). As for the children's attitudes, it was noticed that some of them, aged 5-6, show caring behavior towards animals (dogs, cats or fish) and a desire to nurture plants.

The conducted research was aimed at exploring the connection between direct learning about nature by six year-old children and their level of knowledge and skills. It took into account the children's place of residence, i.e. town or village. The place of residence indirectly implies the type of contact with nature and accessibility to different ecosystems. Even the amount of time spent on observation and revision can have an impact on the acquired knowledge and skills about nature. It should be noted that children living in the city will not have a direct access to such ecosystems as meadows and forests. Although it is possible to arrange trips and explore these sites, such a type of direct contact will be significantly different from the one experienced by children from rural areas. On the other hand, children living in the village may have a limited access to such an amenity as the zoo, for example, because it involves arranging trips to the city and involving parents. These examples show that one's environment can be significant in learning about nature although it is not the only and most important factor. One should also point out the importance of intellectual predispositions.

Given the importance of the environmental education in children's lives, not only in the pre-school age, but also in the future, and considering the lack of research into this interesting subject, it should be assumed that there is an important reason for conducting such research.

Thus, the main aim of the research was to examine the relationship between direct learning about nature by six year-old children and their level of knowledge and skills.

To achieve the aim, four distinct goals have been identified:

1. Getting to know the level of knowledge and natural ability in 6 year-old children before they participate in observing nature in the four selected ecosystems such as a meadow, park, forest and zoo.
2. Learning about the level of knowledge and natural ability in 6-year-old children after the conducted observation of the selected natural ecosystems.
3. Identifying differences in the level of knowledge and skills in 6 year-old children living in the city and the village before and after nature observation.
4. Developing guidelines for effective environmental education in pre-school practice.

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Methodology of the Research

General Characteristics of the Research

The conducted research is connected with the field of knowledge and skills about nature in children living in different social environments. The research needs to be carried out in Poland, since no similar studies have been done in the area so far. On the other hand, effectively-run environmental education in kindergarten might definitely benefit the children in higher levels of education. Due to the objectives, the research was being conducted from September 2015 to May 2016 in four kindergartens: two kindergartens located in cities (Siedlce and Biała Podlaska) and two in villages (Kornica and Domanice).

During the research period teachers organized trips and strolls for children to let them observe the forest, the park, the allotment garden, the meadow, the agritourism farm, animals at the zoo. After coming back to the kindergarten children described what they could see and what was the most interesting in their opinion. Then, they created environmental corners and plastic art pictures. Direct learning about nature was also possible thanks to the research games which extended their interests, enriched their knowledge, catered to their cognitive needs and developed their own activeness. Children examined: What is water and what are its properties? What is wind? What does it mean 'a healthy tree'? What are the plant growth processes? What are the properties of snow? Moreover, the direct contact with nature was achievable for children thanks to a number of their practical actions: the baked potato holiday, cleaning up the world, gardening, preparing salads.

Procedure

The research was conducted in two stages. In September 2015, a pre-test was carried out. The diagnosis concerning the level of children's knowledge and natural skills, i.e. the so-called initial state. For this purpose, a test was adapted to the child's age (6 year-olds) and the core curriculum for pre-school education. A standard card test consisting of 6 illustrated worksheet cards with tasks for children (Standard, 2009) was selected. The images presented on individual cards included:

Card 1. – four seasons landscapes;
Card 2. – different types of fruit;
Card 3. – different types of vegetables;
Card 4. – various animal species living in the meadow;
Card 5. – various bird species;
Card 6. – farm animals and those living at home.

Teachers who conducted the classes in the kindergartens explained to the children the goals of the conducted picture test step by step. Children's performance was rated on a scale of 1 to 3.

1 point – nature skills have not been mastered /low level ability;
2 points – nature skills have been partially mastered / average level ability;
3 points – nature skills have been fully mastered / high level ability.

The child could get maximum 18 points for the correct performance on the test.

In May 2016, a post-test was conducted which was supposed to measure children's knowledge and skills on nature concerning the planned observations in the following ecosystems: a meadow, park, forest and zoo. The kindergarten teachers learned about the details of the planned observations and their schedule. They showed interest in carrying out the research, which ensured its high quality and an ethical approach. The post-test also used a picture test that consisted of 10 illustrated cards. Each card presented a different image of nature elements of the observed ecosystem to which 1 question was formulated. Children's responses were evaluated and recorded in the final follow-up sheet using a three-step scale, similar as the one in the pre-test. The maximum number of points that could be obtained was 30.

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Participants

The research involved 90 children aged 6, including 50 urban children and 40 rural children. All of them were 6-year-olds attending a kindergarten, as there was only one group of 6-year-olds in each institution. The parents agreed to allow their children to participate in the research project. Finally, it should be added that all children taking part in research lived in the vicinity of their kindergartens to which they attended.

Data Analysis

The data analysis was based primarily on the evaluation of the pre- and post-test results. In order to correctly execute each task, each child received max. 3 points, which indicated a fully mastered nature skill. If a child scored 2 points, it meant that he or she had mastered the skill partly, whereas 1 point indicated that the child did not master the skill. In the second stage of the data interpretation, a summary of all the scores obtained by the children in the tests was made. The results are recorded in two summery sheets. One recorded point was obtained by the children from the city, and the other one by the children from the village. A statistical analysis was performed using /in STATISTICA v. 10. The statistical non-parametric Mann-Whitney U test and Pearson Chi test were used to compare the results of the study and demonstrate the differences between children in regard to the place of living criterion. In all analyzed cases the significance level $p = 0.05$ was assumed.

Results of Research

Table 1 presents a summary of the pre-test scores obtained by the tested children.

Table 1. Pre-test scores obtained by children.

No.	Scores	Place of residence			
		City		Village	
		N	%	N	%
1.	8	2	4	0	0
2.	9	4	8	0	0
3.	10	2	4	4	10
4.	11	2	4	0	0
5.	13	10	20	4	10
6.	14	14	28	12	30
7.	15	0	0	6	15
8.	16	8	16	10	25
9.	17	8	16	4	10
Total		50	100	40	100

In order to determine the level of children's results, the scores shown in Table 1 were ranked. According to the didactic measurements developed by Bolesław Niemierko (2000) and applied in Poland, the scores were grouped into three levels. The pre-test points and the corresponding levels are listed in Table 2.

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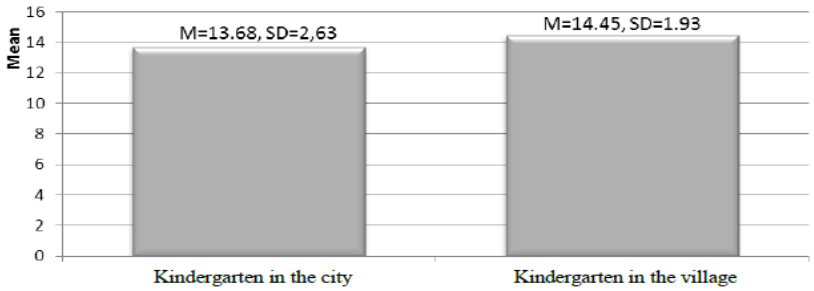
Table 2. Level of knowledge and skills achieved in pre-test nature test.

No.	Level	Scores	Place of residence			
			City		Village	
			N	%	N	%
1.	Low	0 – 9	6	12	0	0
2.	Average	10 – 14	28	56	20	50
3.	High	15 – 18	16	32	20	50
Total			50	100	40	100

The results shown in Table 2 show that 56% of the surveyed children in the city had an average level of knowledge and skills in the pre-test. The second group, i.e. 32%, were children who achieved a high level while the low level of knowledge and skills in nature ability was noted in 12% of the children.

In contrast, low levels of knowledge and skills were not recorded in rural children. Half of the surveyed children – 50% achieved high scores and the same number of children obtained average ones.

While comparing the data obtained in the pre-test, one could notice that significantly higher scores were recorded in children coming from rural pre-schools. A non-parametric Mann-Whitney U test was used to make comparisons and find statistically significant differences between the scores by children from rural and urban pre-schools. Individual test scores were classified into one of three categories: low, average, high. The Pearson Chi test was used to compare test results between pre-schools locations and sequent stages of the study. In all analyzed cases, the significance level p = 0.05 was assumed. The mean test score obtained by the children from kindergartens located in the countryside was 14.45 ± 1.93, whereas those from urban pre-schools was 13.68 ± 2.63. The data concerning this aspect of the study are shown in Figure 1.



Value of the Mann-Whitney U test: U=205.00, Z=-1.04, p> .05

Figure 1: Pre-test scores of children in relation to the location of the kindergarten.

Despite higher achievements recorded in children coming from the rural environment than by those from the city, the statistical analysis did not show a statistically significant difference of the nursery location on the pre-test score (p = .3000).

After a six-month period, when teachers from urban and rural pre-schools conducted classes on the presented above ecosystems that involved the direct learning about nature, during which a picture test was applied again. The study was conducted at the end of May, 2016. The post-test scores are summarized in Table 3.

Table 3. Post-test stores obtained by children.

No.	Scores	Place of residence			
		City		Village	
		N	%	N	%
1.	17	2	4	0	0
2.	18	0	0	2	5
3.	20	2	4	0	0
4.	21	10	20	0	0
5.	22	0	0	4	10
6.	23	2	4	4	10
7.	24	8	16	6	15
8.	25	4	8	4	10
9.	26	0	0	12	30
10.	27	8	16	4	10
11.	28	2	4	4	10
12.	29	10	20	0	0
13.	30	2	4	0	0
Total		50	100	40	100

The sums of the scores in Table 3 achieved by each child were broken down and assigned to the corresponding levels, as in the pre-test sheet. The post-test points and corresponding levels are shown in Table 4.

Table 4. Children's level of knowledge and skills of nature in post-test.

No.	Level	Scores	Place of residence			
			City		Village	
			N	%	N	%
1.	Low	0 – 15	0	0	0	0
2.	Average	16 – 23	14	28	8	20
3.	High	24 – 30	36	72	32	80
	Total		50	100	40	100

The results presented in Table 4 show that in the post-test, low level of knowledge and nature skills were recorded in none of the tested groups. As the children from the city, 72% reached a high level and 28% – an average one. The same tendency was visible in children from the village. 80% of them achieved a high level of knowledge and skills on nature, and 20% – an average one.

The obtained data may indicate that children from rural kindergartens achieved higher results than those from urban kindergartens. In order to determine whether these differences are statistically significant, the same statistical tests were used as in the pre-test. The analysis of the post-test scores showed that children in urban pre-school institutions had slightly better results (24.88 ± 3.57) than those in rural pre-schools (24.80 ± 2.40). Nevertheless, the statistical analysis did not show a statistically significant difference of the nursery location on the outcome of the post-test ($p = .8093$) (Figure 2).

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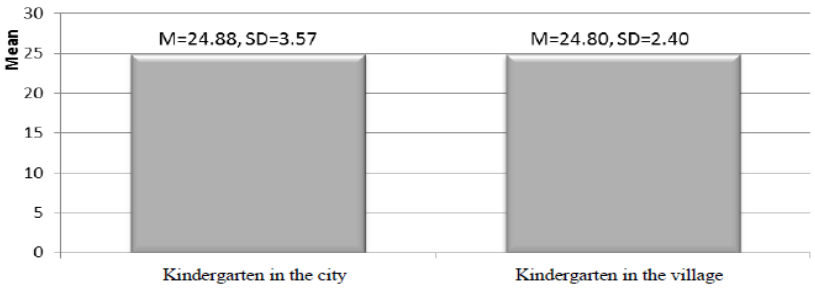
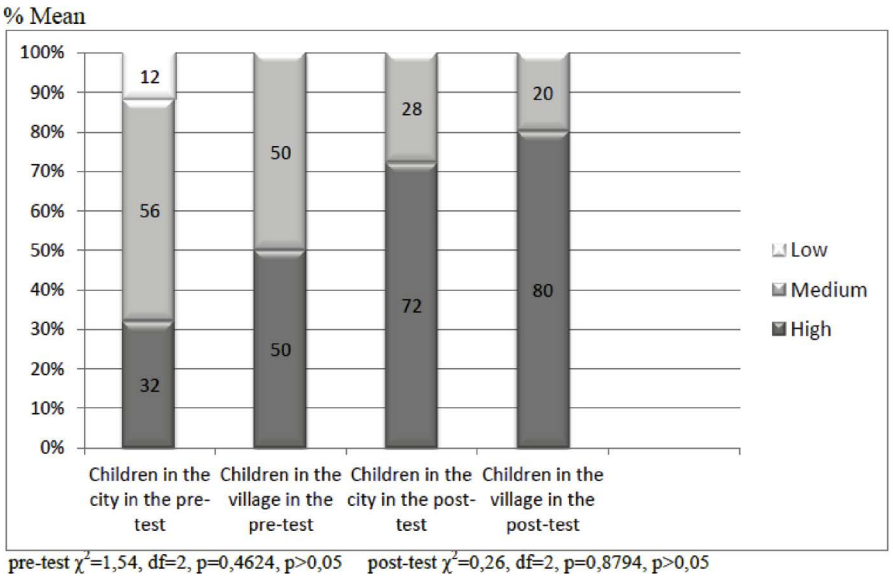


Value of the Mann-Whitney U test: U=239.00, Z=0.24, p> .05

Figure 2: Children's post-test scores in relation to the location of the kindergarten.

The statistical analysis did not show a statistically significant effect of the nursery location on the children's test result, either in the pre-test (p = .4624) or in the post-test (p = .8794). It is worth noting that a high level of knowledge in the pre-test was presented by 50% of the children in rural pre-schools and only 32% of those in urban ones. As for the post-test, higher scores in regard to high levels of performance were reported both in urban children (72%) and in the rural areas (80%). Figure 3 shows the comparison of children's pre-test and post-test results in relation to the location of the kindergarten.



pre-test χ^2=1,54, df=2, p=0,4624, p>0,05 post-test χ^2=0,26, df=2, p=0,8794, p>0,05

Figure 3: Pre- and post-test scores in relation to the location of the kindergarten.

Comparing the scores obtained in the post-test, it should be noted that both groups of children have shown an increase in the level of knowledge and skills compared to the pre-test performance. Nevertheless, statistical analysis did not show a statistically significant difference in pre-test and post-test scores in children from urban pre-schools (p = .5542) and those in rural pre-schools (p = .8220).

Discussion

The aim of the research was to find out differences in direct learning about nature by six-year old children living in urban and rural environments as well as their level of knowledge and skills. This research was conducted in four kindergartens located in town and countryside. Although kindergartens are located in different surroundings, they

follow the same Early Child Education Program, through which the Polish Ministry of National Education records the skills that a child should achieve at the age of 6 in the field of didactic and educational work. This document does not recommend teachers to use any specific working methods for instructing children in kindergartens. Such decisions are left at the disposal of teachers who themselves apply those forms and methods of working with the youngest that take into account such factors as the individual development of the child, interests, family and natural environment.

Two studies were conducted to determine the impact of direct learning about nature on children's knowledge and skills. The pre-test was used to diagnose children's environmental knowledge before the planned observations in the four selected ecosystems: a meadow, park, forest and zoo. The assessment of the pre-test results showed that the children in the village reached an average score of 14.45 points, while those from the city – 13.68 points. Thus, the results by children from the village were better in comparison with those from the city. This may be explained by the fact that rural children have more contact with nature and more opportunities to be in the meadow, field, garden or even in the forest. The positive effects of direct observation of nature and the experience of a pre-school child on the acquisition of new concepts and skills were confirmed by Robbins (2009) and Ntalakoura & Ravanis (2016). In Poland, studies on direct education related to the development of nature concepts in pre-school children were conducted by Żuchelkowska (2015), which showed a positive influence of observation methods and sensory methods on the effectiveness of learning about nature.

After the pre-test, the teachers from the surveyed kindergartens were supposed to conduct environmental education classes in the four indicated ecosystems. The main assumption was that children learn about nature by direct contact. To do that, teachers used nature observations, organized experiments and described causes and effects of certain atmospheric phenomena. The report titled "Outdoor learning about nature", developed by the Institute of Educational Research in Warsaw, recommended implementing research and observation methods while teaching about nature (Poziomek & Ostrowska, 2014). Taking the recommendations on the methods from this report into account, it should be noted that direct exploration of nature by six-year-old children practically reflects the report's guidelines.

The effects of direct exploration of nature by six-year-old children were examined in the post-test. The results of the study confirmed the assumption that children will achieve higher scores in the post-test than those in the pre-test. It turned out that higher better were found in all children, regardless of the location of the kindergarten. Children from the kindergarten received an average score of 24.88 points and those from the rural pre-schools scored 24.80 points. The difference between the pre-and post-test scores was not statistically significant. However, it is important to note an increase in the final results, which proves the rightness and effectiveness of the chosen methods used by teachers working with children, i.e. methods based on the child's direct contact with nature while learning about it. The correlation of the teaching methods with the learning process in a child aged 6 is supported by Kampeza, Vellopoulou, Fragkiadaki and Ravanis (2016), Gallegos-Cázares, Flores-Camacho and Calderón-Canales (2009) and Seker (2008). With regard to the nature education of children at the age of 6, it has been confirmed that the chosen methods were proper because of the good results achieved by children.

Conclusions

On the basis of the empirical evidence and its analysis, some conclusions were drawn which might help to develop work plans in kindergartens in which the study on nature education was conducted. The results from the post-test, compared to those in the pre-test, showed an increase in the knowledge and skills of nature in children attending kindergartens both in the city and in the countryside. This might prove that the initial assumptions were proper and that direct learning about nature has a positive impact on knowledge and skills about it. In the context of planning the didactic and educational work in kindergartens in the field of nature education, it is necessary to take into account the knowledge of some selected ecosystems, and apply those methods through which the child has a direct contact with nature. It is also important to ensure that children not only observe nature but also experience it, learn with all senses.

Through a direct contact with nature, children learn about its elements (structure), activate their senses and minds. The research has shown that the environment in which a person lives has an impact on shaping one's nature skills. Staying in different environments and observing them affects one's memory and knowledge due to the repeatability of the whole process. This was shown in the pre-test results, where the children in the village had higher scores than those from the city. Although the differences in the children's tests were not statistically

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significant in relation to the location of the kindergarten, the obtained results showed an increase in the knowledge of nature. The research also indicated that effective methods of learning about nature are those in which the child has a direct contact with it. It should be noted that there is a further need to study the relationship of other factors and how they relate to the process of learning about nature. For example, the socio-demographic and economic factors that influence the development of the child might be considered here, which would undoubtedly inspire further research in the field of education.

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