

USE OF ICT IN NATURAL SCIENCES EDUCATION OF STUDENTS FOR THEIR ORIENTATION IN THE ENVIRONMENT

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Abstract

This article is devoted to one of the aspects of the research focused on a general problem of interaction between a human being and the environment for person's orientation in it. We see pedagogical orientation as a process: a) creation of conditions encouraging students to study environmental objects and understand the integrity of environment; and b) as a result – expansion of living space of students in the environment.

Method of zoology practical training in city environment aiming at study of the animal world acts as learning instrument in environmental education. It is based on scientific observation of animal life in different biotopes of the city, their conditions, behavior throughout the year that was made by students with the help of visual aids – photo camera and computer. Educational material includes pictures of animals and traces of their activity, characteristics of biotopes, description of animal species, their biology, peculiarities of behavior depending on season. Results of the natural objects' study were presented by students in the form of report – presentation in Microsoft PowerPoint programme. Use of observation method with the help of visual aids during the practical training increased students interest to studying the natural world of the city, fostered development of their individual collection of materials devoted to animal life in the city which can be used as materials for lessons on fauna of their home region; helped them to get more experienced in using photo camera as an instrument for observation of natural objects in motion and in use of computer.

Keywords: *pedagogical orientation, environment, visual method, photo camera, computer.*

Introduction

Understanding of the world, realization of its essence, choice of the way of interaction between a human being and environment are burning issues nowadays. These problems are accompanied with the fact that contemporary people live not in their natural environment but are surrounded with the culture created by them. Dynamic, information saturated and multi-aspect social component of person's environment increased the distance between people and nature (not only adults but also children), offering a newly constructed world – “The third nature”. However, we should not reject social transformations conducted by people in the environment because their activity is focused on creation of comfortable human life, which is also important. Human mentality is arranged in the way that a person, as a reasonable

being who has learnt to make working tools, will always strive for satisfaction of his or her needs in food and habitation in a degree higher than they really need for maintenance of biological component of life. These efforts lead to negative moments in interaction between a person and environment, and first of all those that are reflected in decrease of the role of human spirituality.

It is not accidental that this new world is pragmatic concerning the nature. Understanding of natural regularities and their consistency with social development are of the second priority in human activity. It is proved by data showing decrease of interest to study of natural sciences both at school and at the University (among people of different age groups). The sciences leading to material benefits in a short period of time are prioritized. Environmental problems are important only for a small number of people living on our planet (Lamanauskas, Railiene, 2000; Makarskaite, Lamanauskas, 2001; Goodstein, 2001; Melnik E., Korozhneva L., Vilkonis R., 2004).

This tendency is also typical for Russia. In 2009 the newspaper "Arguments and Facts" published the data proving that from all civil appeals to State Duma delegates only 1% of them were connected with environment. This fact shows that condition of natural objects and their role in development of social life are not considered to be valuable by the majority of the population.

The thing is that a contemporary person from early childhood becomes a part of surrounding where the artificial environment with its objects and phenomena dominates over the natural environment.

Even Konstantin Tsiolkovsky discussing the Universe wrote that a person is connected with life by means of different objects, but understanding of their value becomes significant only if a person "loses a dog or a comb...and life stops". The words of the great Russian scientist contain an idea that transfers to the contemporary generation necessity to understand and keep versatility of the real world objects and their connection with the world of human beings, as well as unavoidability of human life catastrophe in case of breach of natural connections with the environment.

Functioning of the new artificial environment is characterized by the fact that people fail to notice fragments of nature surrounding them. That is why natural system sustainability becomes dependant on people because they transform it in accordance with their needs.

In this connection teachers in the field of natural science education have to: a) find a new approach to evaluation of natural sciences competence in professional training of teachers; b) use innovative techniques in environmental education fostering development of new way of thinking among young people.

"Zoology and introduction to environmental education" is the main and the only one subject where students of the Faculty of primary school education teachers gain theoretical (through lectures) and practical (through laboratory workshops and practical training in the open air) knowledge on animal world. Extracurricular practical work on study of the animal world in the open air is realized during the field practical training.

However in the latest years students' work in natural biotopes becomes rather dangerous because of the increase of a number of encephalitis-infected mites in Karelian forests. That is why we decided to arrange students' practical training in the city. Conditions for this kind of learning activity meet all the requirements for studying the animal world: the city area is close to natural forests (small-leaved and softwood forest); the city is located on the shore of one of the biggest European lakes – the Onego lake. Two rivers flow through the city, on their banks and in park zones a great variety of wild and synanthropic animal species can be found.

The goal of zoology practical training is to make students familiar with animal species composition living on the city territory in different biotopes within the year, to study biological peculiarities of species, traces of their activity and behavior.

From the point of view of natural sciences people can study the majority of animal world objects with the help of simple and available methods. One of such scientific methods is direct observation of animals with the help of human sense organs.

However, experience of work in natural sciences with the first-year students of the Faculty of primary school education had shown that they usually have low motivation to observe animal life in their natural habitat. They were ready to do the tasks with instructive character requiring strictly determined kinds of activity.

That is why we suppose that in the learning process connected with animal world we should encourage students to use constructive methods of study of the animal life during the practical training, this can increase their motivation to study the nature.

The goal of the research was to prove the effectiveness of the research method of environment observation with the help of visual aids during the students' practical training in the open air.

Methodology of Research

This work belongs to the type of reason-consequences researches reflecting quality characteristic of the issue of relationship between a person and environment. Traditional method of lessons organization during practical training course suggests examination of animals habitat by students, use of special laboratory equipment that help to conduct different manipulations in the process of animal life observation. However we had notices that most of the students during the lessons in the open air are no interested in looking for objects of animal world in different biotopes, taking objects of observation in their hands, observing them at short range and so on. Small number of students used special visual tools to zoom the object of observation like binocular. That is why we decided to use a photo camera as a new visual aid for observation of animals in their habitat. It is available for many students because all of those who took part in practical training had mobile phones with photo camera.

During the excursions the students had a task to take a picture of an animal or traces of its activity in the habitat. Then the pictures of different animals were completed with verbal materials. Learning material included biological characteristics of species, description of biotopes, peculiarities of morpho-physiological state of species, traces of their activity, behavior at different seasons. Students with the help of computers conducted these manipulations. Besides electronic resources the students also had published materials on animal world of their home region (Melnik, 2009). The report on the work conducted during the practical training was made in the form of Microsoft PowerPoint presentation. Individual photo materials received by students in different biotopes were combined according to the topics of excursions. Such kind of activity helped us get deeper and more complete insight into animal world of a certain biotope and eliminate lack of experience of students' work with photo camera under conditions of practical training in the open air and shortage of skills in animal life observation.

Considering everything said above we made a questionnaire consisting of six questions. Students were asked to answer first five questions before the practical training. Here they are:

1. What does a city as an environment mean to you?
2. Do you have experience in natural world observation with the help of photo camera?
3. What natural objects would you take pictures of?
4. How do you evaluate your computer skills regarding the use of innovative techniques?
5. What kind of activities do you prefer to conduct with the help of computer?

The sixth question: "How do you evaluate use of visual aids during the practical training?" was asked at the end of the course and after the presentation of students' report. The data were received with the help of anonymous inquiry. 50 first-year students of the Faculty of Primary education teachers, who entered the University in 2009, took part in the inquiry.

Results of Research

The main results of the research are reflected in the table №1.

Table 1. Students' answers on questionnaire.

1. What does a city as an environment mean to you?	
Students' opinion	Number of answers (in %)
1. Buildings, cars, dirty streets, place of living, polluted air	90
2. Schools, work, people	4

3. Opportunity to make a career	3
4. That is everything	3
2. Do you have experience in natural world observation with the help of photo camera?	
1. Yes	70
2. Hard to answer	4
3. No	26
3. What natural objects would you take pictures of?	
1. Interested in landscapes and something else	94
2. Would take pictures of animals	6
4. How do you evaluate you computer skills regarding the use of innovative techniques?	
Enough	100
5. What kind of activities do you prefer to conduct with the help of computer?	
1. Information search	50
2. As means of communication	23
3. Internet access, listening to music, others	27
6. How do you evaluate use of visual aids during the practical training?	
1. It is interesting	56
2. Time-consuming but the result is worth it	24
3. Decided to continue this work	8
4. Discovered world of city nature for themselves	12

As we can see from the table, students' answers to the first questions show that most of them consider a city to be a combination of different objects and phenomena connected with human activity; for four percent of respondents a city means buildings and people, for three percents the city is "career" or "everything". Answers to the second question prove that most of the students taking part in the inquiry used to have some experience in observation of natural objects. However answers to the third question showed that this experience is limited with taking pictures of landscapes, only a small number of students expressed interest to animal world.

Answers to the fourth question showed that all students think that they have enough computer skills. Results of the answers to the fifth question reflect that the main kind of activity conducted with the help of computer is information search, almost a quarter of respondents use computer for communication, and more than a quarter of students are Internet users.

After the practical training and presentation of students' reports we asked the sixth question. Students' answers to the question showed that half of them found use of photo camera and computer at zoology lessons interesting; a quarter of students considered this activity to be time-consuming but worth conducting. A small percent of respondents (8%) said that they would continue using this method, and some students (12%) with the help of such activity discovered the nature of the city.

Discussion

Natural science as no other sciences has resources to study the world around on all levels of its organization. More than that people can study most of the objects of natural world by means simple and available aids and methods. Scientific method of observation with the help of visual aids is available for most of the people. On the other hand contemporary people have lost their interest to study the natural world and don't even notice the part of nature that we have in the city. Nature is no longer referred to as a habitat and has become a background together with other components of environment needed for people to create comfortable living conditions. Share of nature in the environment is being reduced for a person creates a new and, in many respects, artificial world with its objects and phenomena. Dynamic and multi-aspect social life of people doesn't allow them in full measure see the transformation process of the environment and realize the result of breach in connections between people and nature. Understanding of negative human influence on the world around, unfortunately, comes too late.

Our experience of work in natural science education with the first-year students of the Faculty of Primary school education teachers showed that they have low interest to natural objects and in particular, to observation of animals' life in their natural habitat. The majority of those students we communicated

with during the practical training, were ready to do only those tasks in the nature that had instructive character encouraging them to make only strictly determined actions.

We assumed that the majority of young people getting their education in the city don't pay attention to the natural objects because the urban environment completely fills their consciousness.

Probably that is the reason for decrease of interest to natural sciences and studying the natural world in the whole. We suppose that in the process of students' education in natural sciences it is indispensable to encourage them use constructive (creative) methods, increasing their motivation to individual study of nature. That is why in our work with first-year students we used untraditional means of nature study within the city environment. During the zoology lessons of practical training course we offered them to use visual aids of animals' life observation – photo camera.

The task was to take pictures of animals or traces of their life in their natural habitat. Then they were to complete photo materials with scientific information. They had to make biological characteristics of species, description of biotopes, peculiarities of the species features, signs of their activity and behavior during a certain season. These manipulations were made by students with the help of computer. Report on the work conducted during the zoology practical training was presented in Microsoft PowerPoint programme. Individual photo materials on natural life gained by students during the practical training were combined into common blocks – group report. Efficiency of the method was proved in survey made among students at the end of the practical training.

Our assumption that most of the young people don't notice natural objects in the city has proved true. Students' opinions that they reflected in the survey show that the majority of them consider the city as an environment to be a number of separate objects intended for certain kinds of activity of people (education, work), what they also notice is existence of negative phenomena such as dirt and polluted air. Such objects of social life of people as libraries, theatres and sport halls, were not reflected in students' answers. A small number of respondents wrote that they would like to continue their career in the city, but for some students city as an environment doesn't have clear construction.

Most of the students had visual aids used for observation of the natural world we were interested in, some of them already had experience in taking pictures of nature, though they preferred static natural objects like landscapes which are shot easier than moving objects. Only six percent of respondents were ready to take pictures of animals.

Use of photo materials received by the students during the practical training, making video sequence on the animals' life in the city with the help of computer, its further presentation showed the efficiency of our method used in the work with students during the practical training in the open air when they used visual aids. It is proved by the answers of students that we got at the end of the practical training. The training with a photo camera in the hands made most of them interested in the life of animals in the city, they lost their indifference to the environment, some of them decided to continue their observation of the nature.

Conclusions

1. Contemporary young people see in the city, as in environment, opportunities for education, work and career. In their answers concerning the characteristics of the city there was only one component – social one. It was presented as a combination of separate objects and phenomena featuring human activity.
2. It is possible to extend students' knowledge concerning the city environment by means of creating conditions encouraging getting to know the natural world closer.
3. Use of innovative aids at zoology lessons fosters increase of interest towards study of the life of animals.
4. Use of photo camera and computer at zoology lessons fosters motivation of students to research the city environment.

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