

## **SOME ASPECTS OF MOTIVATION OF INTERACTION WITH NATURE**

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**Abstract.** Natural Science education is important for all stages of the human's ontogenesis. Besides, it carries a diverse and specific character throughout different age periods. Therefore, the opinion, that primary school doesn't play a significant role guarantying Natural Science technological literacy, arises as the wrong one. On the contrary, most of the researches indicate that this stage of Natural Science education is of great importance. Moreover, the situation discloses that Natural Science education at primary school is indispensable and the most complicated one. The gaps in knowledge of the discussing subject left within this period of education can be hardly restored in the future. It has been accepted that the 21<sup>st</sup> century should be called a century of modern biology. And it concerns not intellect only. Moral issues, such as respect for nature and harmony with it, have become very important. Finally, the human should understand his inability of becoming the Lord of Nature. Thus, Natural Science Education should somehow support this idea.

Theoretical analysis allows to maintain existing various typologies of motivation. **307** primary school teachers and **257** students have participated in the research. The research indicates that the practical type of motivation of interaction with nature predominates among the primary school teachers and students while the esthetic type of motivation is in the second place. The cognitive type of motivation appears as the weakest one.

**Key words:** primary school, motivation, interaction with nature.

### **Introduction**

Natural Science Education is one of the most urgent activities' spheres at secondary school. The problem of Natural Science Education is a pressing one in Lithuania as well as abroad. However, it must be noticed that more attention to the problems of Natural Science Education is being paid in other countries rather than in Lithuania. Subject analysis of Lithuanian periodicals consisting of scientific works was carried out in 1990-2000. It revealed, that concerning didactics of nature, very few research were fulfilled (Lamanuskas, 2002). Experience of the world shows, that sufficiently a great deal of attention is being paid to the representatives' viewpoints explanation scrutinizing various questions of natural science education. Reversible information allows to correct the content and process of education.

The General Programs of Lithuania secondary schools (1997) inform that the course of natural science at school seeks to create conditions for pupils of adopting bases of contemporary knowledge of natural science and cherishing modern culture of scientific thinking and activity that should be support in real life. It is very important that natural sciences could help pupils to formulate clear understanding of nature, based on modern knowledge of nature science, emphasizing the character of correlation between nature and society, life and culture. The content of subjects of natural sciences attaches possibility to dynamism and systematizing of the teaching process. Thus, realizing of the system of natural science knowledge depends on both - a teacher (choosing and aiming different teaching methods and forms, etc.) and a pupil (methods of studying, motivation, general abilities, etc.) and also on broad administration of education. Furthermore, variety of teaching and learning content, different forms, methods and activities are characteristic of natural science education. All that make the process of education more effective: it develops pupils' intellectual abilities and skills,

creates conditions for their activities, advances thinking operations, generates esthetic feelings, etc. The main fact, that reflects quality of the rising generation of natural science preparation is that in many cases pupils hardly understand even the simplest interactions between animate and inanimate nature, do not manage systematically explain many natural phenomena, etc. It follows, that school don't accomplish its one of the main goals - the young generation isn't being prepared for the future life (Lisovas, 2000). When reforming natural science education at school, Lithuania joins the worldwide process, that includes searching more effective forms and methods of Natural Science Education. Since 1993 Lithuania has been taking part in the Third International Mathematical and Natural Science Education Study (TIMSS), that involves more than 50 countries. The process involves researching and examining programs and textbooks, testing pupils and questioning teachers.

Perceiving, that a living style of the contemporary society is being based on science and engineering, the priority must be attached to creating natural science-technological literacy. The latter years in Lithuania as well as in foreign countries have revealed the situation warning about decreasing of knowledge in natural science sphere. Different researches (Lamanauskas, 1999b; Makarskaite, 2001b; Millar, & Osborne, 2000) indicate, that upper secondary school graduates have poor ideas about animate and inanimate nature and their real and modern world view about natural science is not devised. Holistic realizing of natural phenomena is insufficient. Lack of a systematic approach, when explaining natural phenomena, is extremely poor. Many countries, including USA, Canada, Norway, Denmark, highlight lack of natural science literacy. For example, the best scientists are working in the USA, but at the same time the country expresses concern about the part of the society whose natural science-technological literacy is insufficient. According to D. Goodstein, one of the biggest paradoxes is, that the same system can "produce" scientific elite and "illiterates" /How can the same system produce scientific elites and illiterates? / (Goodstein, 2001). Many authors (Dik, 1999; Jasvin, 2000; Broks, 2001) emphasize importance of natural science education, stressing, that there must be clear balance between social-humanitarian and natural science education when educating the young generation. Technical progress and the progress of science require considerably higher natural science-technological competence from every member of the society. Hence, natural science-technological education must be accomplished consistently and systematically, including all school levels (NSTE – Natural Science and Technological Education).

*NSTE in Primary School*  
*NSTE in Lower Secondary School*  
*NSTE in Upper Secondary School*

The main /or basic/ NSTE is being accomplished within the period of the first ten years (classes 1 to 10) and the General NSTE includes all classes of General School.

Theoretic and empiric researches, provided by a number of scientists, indicated that well-grounded content of teaching and purposefully ordered process of natural science education create opportunities for pupils better to understand surrounding as well as to perceive himself/herself as an active member of ever-changing world and to take over the responsibility for the remaining of our planet. Though there have been many local ecological crises throughout the history of mankind, today it is clearly seen, that a new ecological crisis, now already a global one, is approaching. It requires new organization of the world's evolution process that is basis for renovating correlation among Human, Nature and society. Necessity of creating new morals and ethics under new conditions has already been raised in the past century. It should have been built on new and qualitative relations between Human and Nature. Hence, it can be affirmed, that natural science education is very auspicious to personal self-expressing. But on the other hand, the research indicated that a problem of natural science education was existing. Often different pupils' groups at different ages have shallow, insufficient and ineffective knowledge about nature. Moreover, even in the same

situation (for example, children noticed a creeping beetle on the path) reaction of behavior to the same stimulus can highly differ (child's behaviour can be aggressive, sadistic, pragmatic, practical, cognitive, esthetic, ethic and indifferent). The task of a teacher is his/her ability to make diagnoses and prognoses leaving a chance to correct possible behaviour concerning natural objects. Therefore, trying to make the process of natural science education more effective and seeking better results, it is not enough to advance the content of education or juridical documents regulating the process of education. Advancing qualification of teachers of natural sciences is extremely important. It can be accomplished after analysis of teachers' professional skills and their purposeful development (Raven, 1999; Lamanauskas, 2001; Makarskaite, 2001; Mueller, 2001).

Primary school is a fundamental period in the complete system of general education. The world of nature is extremely important for children in early school days. Firstly, it is a spring of feelings and imagination. Interaction with nature becomes more intensive this time. On the other hand, it is still not of a deep, real or general character (Jasvin, 2000, p.202). The foundation for pupils' natural science literacy comes from primary school where the younger schoolchildren study considerably a long times - four years and more. This is the most favourable period of time to provide preparative natural science knowledge and to form positive emotional-valuable interaction with nature.

A primary school teacher is expected to show competence in teaching natural sciences. It is being emphasized by many researchers. They exceptionally highlight understanding of modern natural science conceptions and ability respectively to make them understood by pupils (Wenham, 1995; Ovens, 2000; Millar & Leach, 2000, etc.).

The following propositions can be specified:

- Effective natural science education require conformable psychological substantiation;
- Interaction with Nature varies and is specific within different periods of life;
- The mission of the teacher is to wisely manage a developing process of "true" interaction with nature/particularly in Primary School;
- From the practical point of view there isn't any research in Lithuania assigned to investigate interaction with nature within different periods of ontogenesis.

The question of typology of interaction with nature is complicated. The opinions of the researchers differ. Kalmykov A.A., and Kalmykova A.V. specify four types of interaction with nature

(Kalmykov, 2000; Kalmykova, 2000):

1. Ego-orientated natural centrism.
2. Eko-orientated natural centrism.
3. Ego-orientated anthropocentrism.
4. Eko-orientated anthropocentrism.

Some researchers from the US specify nine types of interaction with nature (Reiton, 1996; Langenau, 1996):

1. Naturalistic; 2. Ecological; 3. Humanistic; 4. Ethical; 5. Scientific; 6. Utilitarian; 7. Ambitious; 8. Negative; 9. Esthetic.

According to the results of the presented scientists, moral (more than 20%) and utilitarian (up to 15%) types of motivation of interaction with nature are very clear in the American population. Following the opinion of Kavtaradze, the most dangerous phenomenon is, that contemporary ecological education is filled with spirit of pragmatism, because protection of nature is being accentuated more than that of environment (Kavtaradze, 1990). In this case teacher's motivation of interaction with nature plays an extremely important role. The teacher makes his knowledge and

experience known and understood by pupils. Thus, it is urgent to make ready scientifically motivated methodology of the process of natural science education that is to organize in primary school. It is supposed to develop non pragmatic and humane correlation with nature within the process of natural science education. The problem is very often connected with the content of education (programs, textbooks, other sources of information).

**Problem:** general psychological and psycho-pedagogical aspects of interaction with nature, its questions of formation within the process ontogenesis and the methods of the interaction of psychological diagnostics are being poorly researched in Lithuania.

**Object of the research:** motivation of interaction with nature of primary school teachers and students - would-be teachers of primary school.

**Goal of the research:** diagnostics of the main / basic/ type of motivation that is connected with the objects of interaction with nature.

### **Methods of the research and characteristics of the respondents**

The name of the method is “Alternative” (Jasvin, 2000). The research includes two stages. In the first stage (October – November, 2001) **307** cases of interactions with nature of teachers of primary school (all respondents were female) were examined. The respondents were picked out applying the principle of seriated (bunch) research sample formation. Therefore, the teachers from different regions of Lithuania were involved into the sample. In the second stage the research of students’ motivation was carried out. The research sample was made from the students of three Universities of Lithuania, which were training primary school teachers. Thus, **257** female students were taking part in the research: 143 of those were from Siauliai University, 84 – from Vilnius Pedagogical University and 30 – from Klaipeda University. The respondents were picked out in proportion to the general number of the full time students studying at higher schools at the time of the research. The premise, that motivation of interaction with nature of teachers working at schools and that of students shouldn’t virtually differ, has been made. The results of the research can be compared as following:

The test including twelve questions was presented to the participants of the research:

#### **Situations**

I. In the aquarium you should keep:

- A. fish of different and attractive colours;
- B. fish of interesting behaviour.

II. You would rather pick (a more suitable activity for you):

- A. herbs;
- B. plants for cordial’ making.

III. If you were a teacher of biology you would rather tell pupils:

- A. about texture of animals;
- B. about looking after animals.

IV. When inviting the botanical gardens, you:

- A. admire the tropical plants;

- B. wish to acquire a sprout of some plant to grow it at home.
- V. While reading a book about mushrooms you will pay more attention:  
 A. to their texture;  
 B. how to tin them for winter.
- VI. Being a plant breeder you should raise new:  
 A. varieties of flowers;  
 B. varieties of polymeric plants.
- VII. After buying a new calendar firstly you should read:  
 A. poems of talented poets about nature;  
 B. observations from a naturalist's diary.
- VIII. After acquiring the diploma of a scientist-agriculturist you would like to work:  
 A. in the laboratory;  
 B. in the experimental station.
- IX. You should find a dog:  
 A. to take care after him;  
 B. to look after your living place.
- X. You would rather read:  
 A. a book about beauty of nature;  
 B. a reference book about how to look after plants and animals.
- XI. If you worked in the forestry you would like:  
 A. to watch growing and developing of trees;  
 B. to run an office of valuable wood preparation.
- XII. If you were invited to spend your weekend on the campsite with a nice orchard, you would rather go:  
 A. in May;  
 B. in August.

The answers to the questions of every situation codify a concrete type of motivation (table 1).

**Table 1. Key for establishing the type of motivation**

|           | Situations |   |   |   |   |   |   |   |   |    |    |    |
|-----------|------------|---|---|---|---|---|---|---|---|----|----|----|
|           | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Esthetic  | A          |   |   | A |   | A | A |   |   | A  |    | A  |
| Cognitive | B          |   | A |   | A |   | B | A |   |    | A  |    |
| Practical |            | A | B | B |   |   |   | B | A | B  |    |    |
| Pragmatic |            | B |   |   | B | B |   |   | B |    | B  | B  |

**Results of the research**

The activity, that the respondent prefers, affords an opportunity to make decisions about the character of motivation of interaction with nature. Every type has a particular rank (1,2,3,4). The type of motivation, which obtains dominant specific weight, is being interpreted as the most important /leading/.

The teacher's type of motivation acts moulding pupils' motivation using the aspect of interaction with nature. The time of junior school years is being interpreted as a "crisis" of the ontogenetic period and at the same time it is the most auspicious one moulding non-pragmatic relationship with nature.

Results of the research in the table 2 indicates the following situation:

**Table 2. Distribution of the respondents' answers according to the situations (%)**

| Situation | Codified type of motivation | Teachers |      | Students |      |
|-----------|-----------------------------|----------|------|----------|------|
|           |                             | N        | %    | N        | %    |
| 1.        | <i>Esthetic</i>             | 216      | 70,4 | 199      | 77,4 |
|           | <i>Cognitive</i>            | 91       | 29,6 | 58       | 22,6 |
| 2.        | <i>Practical</i>            | 149      | 48,5 | 130      | 50,6 |
|           | <i>Pragmatic</i>            | 158      | 51,5 | 127      | 49,4 |
| 3.        | <i>Cognitive</i>            | 45       | 14,7 | 30       | 11,7 |
|           | <i>Practical</i>            | 262      | 85,3 | 227      | 88,3 |
| 4.        | <i>Esthetic</i>             | 159      | 51,8 | 125      | 48,6 |
|           | <i>Practical</i>            | 148      | 48,2 | 132      | 51,4 |
| 5.        | <i>Cognitive</i>            | 78       | 25,4 | 67       | 26,1 |
|           | <i>Pragmatic</i>            | 229      | 74,6 | 190      | 73,9 |
| 6.        | <i>Esthetic</i>             | 214      | 69,7 | 166      | 64,6 |
|           | <i>Pragmatic</i>            | 93       | 30,3 | 91       | 35,4 |
| 7.        | <i>Esthetic</i>             | 105      | 34,2 | 88       | 34,2 |
|           | <i>Cognitive</i>            | 202      | 65,8 | 169      | 65,8 |
| 8.        | <i>Cognitive</i>            | 71       | 23,1 | 74       | 28,8 |
|           | <i>Practical</i>            | 236      | 76,9 | 183      | 71,2 |
| 9.        | <i>Practical</i>            | 165      | 53,7 | 143      | 55,6 |
|           | <i>Pragmatic</i>            | 142      | 46,3 | 114      | 44,4 |
| 10.       | <i>Esthetic</i>             | 129      | 42,0 | 94       | 36,6 |
|           | <i>Practical</i>            | 178      | 58,0 | 163      | 63,4 |
| 11.       | <i>Cognitive</i>            | 257      | 83,7 | 199      | 77,4 |
|           | <i>Pragmatic</i>            | 50       | 16,3 | 58       | 22,6 |
| 12.       | <i>Esthetic</i>             | 157      | 51,1 | 95       | 37,0 |
|           | <i>Pragmatic</i>            | 150      | 48,9 | 162      | 63,0 |

As can be seen from the table 2, every type of motivation is being codified by 6 answers presenting different situations. After generalization of primary results, a new type of motivation having dominant specific weight was singled out. It is being interpreted as the most important one (table 3).

**Table 3. Ranks of types of motivation of interaction with nature**

| Rank | Type of motivation | Teachers | Students |
|------|--------------------|----------|----------|
|      |                    | %        | %        |
| 1.   | Practical          | 31,2     | 31,7     |
| 2.   | Esthetic           | 27,1     | 24,9     |
| 3.   | Pragmatic          | 22,3     | 24,1     |
| 4.   | Cognitive          | 19,4     | 19,3     |

The results indicate that the most important type of motivation is a practical one. The next type of motivation that also plays significant role is an esthetical one. The cognitive type of motivation of interaction with nature is the fourth and the weakest one. The essential statistically important differences between teachers' and pupils' structure of motivation were not established. The meanings of the criterion  $\chi^2$  are very small and in all cases make  $p > 0,05$ .

### Conclusions

Fulfilled theoretical analysis of the problem allows to affirm that different typology of motivation of interaction with nature is existing.

It was founded that primary school teachers as well as students preferred the practical type of motivation of interaction with nature as the most important one.

The cognitive type of motivation according to its significance is the fourth one. It is supposed that there is a connection between pupils' knowledge about nature and motivation of a teacher. Ignorance of cognitive interaction with nature (cognitive motivation) reduces effectiveness and quality of natural science education in primary school. It must be acknowledged that teachers of primary school are of limited opportunities in the field of contemporarily natural science.

The methodology "Alternative" of diagnostics of motivation helps with valuable information. Such diagnostics is necessary from the point of view of research. It is also important when creating a process of natural science education in primary school.

Correction of psycho-pedagogical developing of primary school teachers and students embracing motivation of interaction with nature must be turned to intensification of cognitive motivation.

It is obvious, that the teacher directly influences pupils' evolution of correlation with nature. Hence, his knowledge of the discussing subject should be advanced enough. When training teachers for primary school, particular attention should be paid to the moduli structure and content of natural type studies and to methodology of teaching. An important role play such module of studies as *Conception of Natural Science World, Conception of Holistic Natural Phenomena, Integral Natural Science Education at Primary School, Ecological Pedagogy, Ecological Philosophy, Bio-ethics, etc.* Conditions for work should be created for working primary school teachers (special courses and workshops / system of ecological trains) improving and advancing their professional skills of aspect of interaction with nature. The form of a summer "green camp" is a particularly effective one (the length of time is 3 - 5 days). The teachers have many possibilities directly advance their experience of natural science: they take part in expeditions, carrying a character of natural science, learn to watch natural phenomena, become informed about innovations of methodology of natural science and environmental observations and experiments at primary school, create projects, etc. An individual project is a very important component of such a camp. It is being fulfilled personally at camp. At the end of the camp a mini conference is being usually held where the results of the camp are being

discussed. The teachers also have possibility to sheer their personal experience and to plan peculiarities of the activities for the next school year.

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## Резюме

# НЕКОТОРЫЕ АСПЕКТЫ МОТИВАЦИИ ВЗАИМОДЕЙСТВИЯ С ПРИРОДОЙ

Винцентас Ламанаускас

Начальная школа – фундаментальное звено во всей системе общего образования. В младшем школьном возрасте мир природы для детей очень важный. В первую очередь это источник образов и чувств. В этом возрастном периоде отношение к природе становится более интенсивным. С другой стороны это отношение, как отмечает В.Ясвин, еще не обладает достаточной широтой, осознанностью, обобщенностью (Ясвин В., 2000; с. 202).

Учитель начальных классов должен быть компетентным в сфере естественнонаучного образования /ЕНО/. В последние десятилетия в ряде стран наблюдается снижение естественнонаучной грамотности общества. Особенно надо подчеркнуть:

- Эффективное ЕНО требует соответствующего психологического сопровождения;
- Наблюдается специфика отношения к природе в разные возрастные периоды;
- Учитель должен педагогически управлять процессом развития "хорошего" отношения к природе /особенно в начальных классах/;
- Экспериментальных исследований восприятия мира природы и развития отношения к нему в Литве почти нет.

Тип мотивации учителя влияет на формирование мотивации учащихся в аспекте их отношения с природой. Младший школьный возраст выделяется как "кризисный период" в онтогенезе и как самый подходящий в формировании непрагматического отношения к природе.

Теоретический анализ проблематики мотивации взаимодействия с природой позволяет утверждать, что существует разные типологии мотивации. Установлено, что для учителей начальных классов и студентов /будущих учителей/ ведущим является практический тип мотивации (31,2% учителей и 31,7% студентов). Вторым по значимости является эстетический тип мотивации. Установлено, что четвертым по значимости является когнитивный тип мотивации. Можно предполагать, что между знаниями учеников по вопросам познания природы и мотивацией учителя существует взаимосвязь. Игнорирование когнитивного отношения к природе (когнитивная мотивация) снижает эффективность и качество естественнонаучного образования в начальной школе. Следует открыто признать ограниченность учителей начальных классов по вопросам современного естествознания. Методика диагностики мотивации "Альтернатива" позволяет получить действительно полезную информацию. Такая диагностика необходима не только в исследовательских целях, но и для конструирования процесса естественнонаучного образования в начальной школе (программы, содержание, новые формы обучения и т.д.). Психолого-педагогическая коррекция развития субъективного отношения учителей начальных классов к природе должна быть направлена на развитие когнитивного типа мотивации.

**Ключевые слова:** начальная школа, мотивация, взаимодействие с природой.

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