

WCETR 2013

Research of Russian Students' Ecological Competency

Gulfia.G. Parfilova ^a *, Aidar M. Kalimullin ^{b**}

^a Kazan (Volga region) Federal University, Mezhlauka str. 1, Kazan 420021, Russia

^b Kazan (Volga region) Federal University, Mezhlauka str. 1, Kazan 420021, Russia

Abstract

The aim of the research is to study and diagnose Russian higher educational institution students' ecological competency formation with all its components aggregated. On the basis of the received results, recommendations of special psychological and pedagogical work organization to increase the level of students' ecological competence are given. 192 students of Kazan (Volga region) Federal University took part in the experiment. A battery of tests (questionnaire "Naturaphil" by V.A. Levin and S.D. Deryabov; E.A. Klimov's test "Preferable types of vocational activities"; verbal associative method "ESOP" by V.A. Yasvin and S.D. Deryabov) was used to collect information.

© 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Selection and peer-review under responsibility of the Organizing Committee of WCETR 2013.

Keywords: competency, competence, professional competency, Russian students, ecological competency

1. Introduction

The analysis of problems urgent for humankind shows that universal human issues of the XXI century were divided into four groups: social and economic (inequality, poverty, hunger); ecological (population growth of Earth, bio-contamination); energy (exhaustibility of natural resources, global health deterioration of population); ethical (contradictions between world religions) and gnoseological (the difference between proficiency and education).

Characteristics of global moral and ecological crisis of humanity the world found itself in, consequent on sharp disruptions of ecological balance and incompatibility of human life with the life environment created by them, set goals before each individual to master their life management principles that are in constant interaction with external environment, tasks of natural resources rational use and awareness of a person's role, place and value in the

*Corresponding Author: Gulfia.G. Parfilova. Tel.: +7-903-314-5564
E-mail address: parfilova2007@mail.ru

evolution of Earth and Space as well. Global universal ecological crisis has been caused not only by scientific and technical progress, but on the contrary, by poor distribution of scientific and ethical knowledge in the society what has generated a favorable ground for taking irresponsible decisions, uncontrolled production of human demands of low level and their satisfaction at the expense of the natural environment.

The whole generation of Russian youth has grown up being distanced from the world of nature. They selfishly treat nature, without reflecting on devastating consequences of their activity. Thus, higher educational institutions should place more emphasis on the issues of moral and intellectual aspects of ecological education.

The modern ecological situation has generated a tendency for rapid growth of contemporary science guidelines on nature. Ecological knowledge is becoming the subject of study of Russian researchers of different areas of sciences and acts as a necessary condition for harmonization of interaction between nature and society. However, the knowledge divided into separate subjects is not counterbalanced by the existing level of their integration. Students experience shortage of imaginative and emotional relation to the world, their philosophical comprehension of it is poor, the majority of students have low awareness of their connection with nature, they do not understand their value, place and role in nature.

In this regard, the Russian society began to pay attention to issues of younger generation ecological competency formation as its own fate and the future of the planet will depend on it tomorrow. Today one of the leading ideas of scientific education modernization in Russia is the formation of an ecologically competent person. The training of an ecologically competent generation understanding the negative influence of a person unreasonable intervention into natural processes, possessing specific knowledge, skills necessary for taking competent decisions is becoming the goal of education.

One of the guidelines in the changing Russian higher education is the competence-based approach. In the context of modern ecological situation in many regions of Russia, the introduction of the ecological component into the specialist's professional competency structure will allow in due time to find valid decisions of ecological problems.

Some aspects of the ecological education problem have been studied by many scientists

E.F.Zeer (2005) [10], I.A. Zimnyaya (2003) [11], J. Raven (2002) [18], A.V. Khutorskoy (2003) [24] and other scientists investigated the phenomenon "competency". Yu.V.Vardanyan (2003) [2], V. N. Vvedensky (2003) [3], V.A.Slastenin (2008) [20], S. E. Shishov (2002) [25] gave attention to the issues of different specialists professional competency formation.

A.N. Zakhlebny (1987) [8], I.D. Zverev (1990) [9], N.M. Mamedov (2003) [14], I.T. Suravegina (1987) [22] were engaged in theoretical and practical issues of ecological education. Some works are devoted to studying of students' ecological education (A.V.Mironov (1990) [15], T.V. Nevzorov (1998) [16], etc.). Theoretical aspects of students' person-centered ecological training model have been developed by V. V. Serikov (1994) [21], E.V. Traulko (2004) [23], etc.

Psychological aspects of ecological education are considered in the researches of S. N. Glazachev (1997) [5], S.D. Deryabo (1996) [7], V.A. Yasvin (1996) [7]. They focus on the formation of students' ecological consciousness, with psychological and psychophysiological features of different age categories taken into account.

Works of F.S.Gaynullova (2004) [4], I.V. Petrukhina (2006) [17], O.G. Rogova (2007) [19] are devoted to the study of future teachers' ecological competency formation. These researches prove the necessity to develop future teachers' ecological competency, expose the sense of this process, its peculiarities connected with the process of teachers' training for different specialties.

In this work we relied on the following definitions of the research key concepts.

Competency is the integrative characteristic of person's (worker's) qualities focused on the solution of actual tasks determined by an individual's actual (or potential, desirable) position (Kasprzhak, Ivanov, 2004) [12].

Competence is a set of qualification requirements necessary for this professional activity, and the set of actions (procedures, authorities, rights), supposed to be essential for the representative of this profession (Kasprzhak, Ivanov, 2004) [12].

Professional competency is defined in literature as the integral characteristic of business and personal qualities of a specialist, reflecting not only the level of knowledge, abilities, experience, sufficient for the achievement of professional activity goals, but also a person's social and moral position (Goneev, Pashkov, etc., 2004) [6].

Ecological competency is a systemic, integrative quality of individuality, characterizing the ability to solve problems and tasks of different levels, arising in life situations and professional activity, on the basis of created values and motives, knowledge, educational and life experience, specific features, inclinations, needs (Alekseev, 2006) [1].

The aim of the research is to study and diagnose Russian higher educational institution students' ecological competency formation with all its components aggregated.

2. Methods

According to the goal of the research we used the diagnostic testing with the application of such methods as: the method aimed at diagnosing of subjective attitude to nature – questionnaire "Naturaphil" by V.A. Levin and S.D. Deryabo; E.A.Klimov's (2004) test "Preferable types of vocational activities" [13]; verbal associative method "ESOP" by V.A.Yasvin and S.D. Deryabo, and also frequency response analysis.

Diagnostics of ecological competency level formation was carried out in compliance with the structure of ecological competency (cognitive, operational, demand-motivational and value-meaningful components).

To assess cognitive and operational components development we applied the questionnaire "Naturaphil" aimed at the diagnosing of intensity of subjective attitude to nature. Intensity of attitude is understood as its structurally-dynamic characteristic, that is an index of what spheres and to what degree the attitude is displayed. The questionnaire includes 4 main scales corresponding to four components of intensity:

1. Perceptual-affective scale (PA) diagnoses the level of: 1) aesthetic acquisition of objects of nature, 2) responsiveness to their vital manifestations, 3) their ethic acquisition.

2. The cognitive scale (C) diagnoses the level of changes in motivation and orientation of cognitive activity related to nature and are manifested in the readiness and aspiration to receive, search and process information about objects of nature.

3. The practical scale (Pr) is designed to diagnose the level of readiness and aspiration for unpragmatic (not setting the purpose to receive "a useful product" from nature) practical interaction with objects of nature, for acquisition of technologies necessary for this purpose.

4. The Action scale (Ac) diagnoses the level of a person's activity aimed at changing the environment according to the subjective attitude to nature.

5. The secondary scale of naturalistic erudition (NE) diagnoses the totality of data a person has about objects of nature.

Each scale consists of 10 dichotomous items (according to the principle "yes –no"), all in all 50 items.

To diagnose the demand-motivational component there was applied the test "Preferable types of vocational activity", according to E.A. Klimov's classification of professions types:

1. "individual-nature"
2. "individual - technics"
3. "individual - semiotic system"
4. "individual -artistic image"
5. "individual - individual"

It includes 30 statements to agree or disagree with.

The verbal associative method "ESOP", allowing to establish the type of dominating attitude concerning nature, was applied to research the value-meaningful component of ecological competency. 4 types of attitude are singled out: a person perceives nature as an object of beauty ("esthetic" attitude), as an object of study, knowledge ("cognitive"), as an object of protection ("ethical"), and as an object of usefulness ("pragmatic"). The method consists of 12 items. Each item contains a stimulus word and five words for associations. (Four words correspond to four types of attitude, the fifth is used to distract attention, "the litter word").

The research was conducted at the Institute of Pedagogy and Psychology of Kazan (Volga region) federal university. 192 full time students of the 3-4 courses, aged from 19 till 21 took part in it.

3. Results

As a result of the experimental research, by means of frequency analysis in compliance with the method ("ESOP"), students were divided into two groups according to the type of dominating attitude concerning nature: those who perceive nature as an object of beauty ("esthetic" attitude) – 53,6% and those who perceive nature as an object of usefulness ("pragmatic" attitude) – 46,4%.

The method "Preferable types of vocational activity" according to E.A.Klimov's classification of professions types was also applied to research the level of students' ecological competency development. The data received by means of the test, show that 50% of examinees aspire to acquire such type of a profession as "Individual-individual" which includes such kind of activity as upbringing, children's teaching (educator, teacher). It is explained by students' study at the Institute of Pedagogy and Psychology, their mastering of the pedagogical activity and obtaining the qualification of pedagogue-psychologist. Some students have an orientation for several types of professions at the same time. 54% of students have no motivation to master the profession of such kind as "individual-technics" that is explained by absence of interest to natural sciences and students' humanitarian mindset. Neither of students (0%) has motivations to master such type of a profession as "Individual - nature". It can testify to a low level of students' ecological consciousness development, but most likely it is explained by students' desire to work in another sphere of activity.

At the following stage of the experimental research, the task was to identify the intensity value index of subjective attitude to nature received in each group. Intensity value is determined as a sum of scores according to four main scales (perceptual-affective + cognitive + practical + action). Results of each scale (from 0 to 10 points) are transferred to a standard scale of stanine. The index of intensity value, received by summing up the results of four scales, is transferred to a standard T-scale.

Further, in each group the average value of attitude intensity parameter was calculated. In the group with the dominating mind-set "nature as an object of beauty" the average value is equal 43, and in the group with the dominating mind-set "nature as an object of usefulness" the average index is equal 42. Thus, attitude intensity to nature in both groups can be estimated as above the average. It can testify to students' aesthetic mastering of objects of nature, responsiveness to their vital manifestations; about aspiration to receive, seek, process information on objects of nature and to change the environment according to the subjective attitude to nature. It is also possible to say, that the set of data examinees have about objects of nature coincides with biological knowledge and students' estimations that exposes quite good index of students' studying at the Institute of Pedagogy and Psychology erudition though examinees left comprehensive educational establishments 3-4 years ago and their professional activity is focused on the work in pedagogical and psychological but not ecological area.

The level of students' ecological competency testifies to the existence of image and emotional attitude to the world, understanding their link with nature, comprehension of one's place and role in nature, but all this is developed to a poor degree and requires some efforts to increase the level of ecological competency.

4. Conclusions

All graduates of pedagogical higher educational institutions have to be focused on education of an ecologically competent person. For this purpose it is necessary not only to expand and deepen ecological education at all teachers training higher educational institutions, but also to focus students on the rational person - nature relationship in their future activity.

Based on the structure of ecological competency (cognitive, operational, demand-motivational and a value-meaningful component), the educational work aimed at the increase of ecological competency can be divided into the following blocks:

- To perfect a cognitive component (ecological knowledge, thinking and imagination) - to include subjects of ecological character into the learning process, to conduct seminars, disputes, ecological problem situations solving;
- To improve an operational component (skills, learning skills, ecological activity experience) – to carry out labour and ecological landings, to go to preserved areas for the purpose of their protection;
- To enhance the level of demand-motivational component (ecological guideline), there should be conducted trainings, games and exercises aimed at the increase of motivation to collaborate with nature and protect the environment, besides visits to preserved areas should be arranged .
- To perfect a value-meaningful component (ecological values, love for nature, ecological ethics), an academic subject "Ethics of ecological behaviour", watching movies, reading books about ecology, visiting museums, zoos and botanical gardens should be included into the educational process.

References

Alekseyev, S.V. (2006) Lines of competency based and activity based approaches relationship in the system of ecological education. In Modern education modernization: to ecological competency through ecological activity. St. Petersburg: Krismas+

Vardanyan, Yu.V. (2010) Development of a student as the subject of professional competency mastering. Saransk: MGPI

Vvedensky, V. N. (2003) Modelling of teacher's professional competency. *Pedagogics*, 10, 51-55.

Gaynullova, F.S. (2004) Formation of ecological competency of future elementary school teachers in the context of higher educational institution. PhD thesis. Moscow.

Glazachev, S. N. (1997) Ecological culture, education and civilizational choice of Russia. *Science and school*, 3, 4-10.

Goneev, A.D., Pashkov, A.G. etc. (2004) Pedagogics of professional education. In Professional education as pedagogical system. Moscow: Publishing center "Akademiya".

Deryabo, S. D. & Yasvin, V.A. (1996) Ecological pedagogics and psychology. Rostov-on-Don: Publishing house "Felix".

Zakhlebny, A.N. (1987) The content of ecological education at a secondary school: Theoretical grounds and ways of realization. PhD thesis. Moscow.

Zverev, I.D. (1990) Ecology in school education: New aspect of education. Moscow: Znanie.

Zeer, E. & Symanyuk, E. (2005) Competence-based approach to modernization of professional education. *The higher education in Russia*, 4, 23-30.

Zimnyaya, I.A. (2003) Key competences – a new paradigm of education results. *The higher education today*, 5, 34-42.

Kasprzhak, A.G. & Ivanov, L.F. (2004) Modernization of educational process in elementary, main and high school: alternate solutions. Moscow: Prosveshcheniye.

Klimov, E.A. (2004) Psychology of professional self-determination. Moscow: Academy.

Mamedov, N.M. (2003) Bases of social ecology. Moscow: Stupeni.

Mironov, A.V. (1990) Strengthening of an ecological and professional orientation of high school naturalists' disciplines in training of the elementary school teacher. *Elementary school*, 6, 77-81.

Nevzorov, T. B. (1998) Pedagogical conditions of integrative approach to ecological education of youth realization. PhD thesis. Kemerovo.

Petrushina, I.V. (2006) Formation of ecological competency of future physical culture and life safety teacher. PhD thesis. Chelyabinsk.

Raven, J. (2002) Competency in modern society. Identification, development and realization: Trans. from English. Moscow: Kogito-center.

Rogovaya, O.G. (2007) Development of ecologo-pedagogical competency of a specialist in the field of education. PhD thesis. St.Petersburg.

Slastenin, V., Isayev, I. etc. (2008) Pedagogics: Teaching guide for students of pedagogical educational institutions. Moscow: School Press.

Serikov, V.V. (1994) Person-oriented education. *Pedagogics*. 5, 16-20.

Suravegina, I.T. (1987) Ecological education is the important direction of comprehensive schoolwork. *Biology at school*, 3, 20-28.

Traulko, E.V. (2004) Projection of person-oriented ecological learning of students of abiological specialties. PhD thesis. Novosibirsk.

Hutorsky, A.V. (2003) Didactic heuristics. Theory and technology of creative education. Moscow: Moscow State University publishing house.

Shishov S. E. & Agapov I.I. (2002) Competence-based approach to education. *The best pages of the pedagogical press*, 3.