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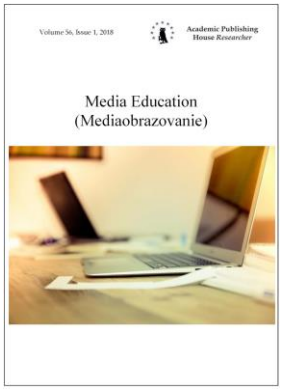

Development of Digital Skills and Media Education System: From the Organization of Environmental Education of Preschool Children to the ICT Competence of Teachers

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Abstract

The era of globalization and media presents new opportunities for a comprehensive study of various aspects of social life, including a large field of social sciences as education and pedagogical sciences. The mentioned factors and a number of descrepancies served as the starting point for studying the problem of developing a system of digital skills and media education within the organization of environmental education of preschool children and the formation of ICT competence of teachers. Modernity witnesses harmful technogenic influence of human activity on the natural world, which leads to a global crisis in the relationship between man and nature. At present, the Russian Federation is experiencing a new digital impulse, which entails research into the impact of information and media technologies on the sociocultural and educational activities of all participants of educational relations.

Thus, the purpose of the article lies in theoretical justification and experimental verification of new methodology as an integrated system of environmental education of preschool children and the formation of ICT competence of the pedagogical corps of a preschool organization. To achieve this goal, the authors used a set of methods: theoretical (analysis of scientific literature on the research problem; summative methods (studying and generalizing the experience of specialists working in educational organizations); experimental methods (observation, interviewing, pedagogical experiment, etc.). In addition, the article compares and discusses different domestic and foreign researchers' results on environmental education of preschool children and the ICT competence of teachers. The results of a study conducted on the basis of 10 preschool organizations in the Moscow region are presented and commented in detail. The research directions of the development of the problem of environmental education and ICT competence of teachers in the new digital media reality are presented. The results of the study allow us to find a solution to the pedagogical tasks of the innovative organization of environmental education of preschool children, taking into account the effective formation of the ICT competence of teachers; and also open up new vectors for the research in the context of systemic changes in education and digitalization.

Keywords: environmental education, media education, preschool children, ICT competence of teachers, pedagogical conditions, digitalization.

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1. Introduction

The socio-economic transformations of the most important areas of the Russian Federation followed as an effective implementation of the Decree of the President of the Russian Federation "On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024" dated 05.05.2018 No. 204, which created the conditions for the future educational development of the younger generations. In particular, it was noted that the Government of the Russian Federation, developing a national project in the field of education, should keep in mind that by 2024 it is necessary to ensure: "creation of conditions for the development of children aged 0 to 7 years, implementation of psychological, pedagogical, and advisory assistance to parents of children receiving preschool education with a focus on media resources and mass media" (Decree..., 2018).

Media education as a scientific fieldbegan to develop in the 1960s, when it was defined as a purposeful psychological and pedagogical process of personality development with the help of mass communication.

A new purpose of education is the development of preschool children in the field of environment and the creation of effective specially organized pedagogical conditions for the ecologization of childhood, which include knowledge about the natural world, interdependent relationships, as well as unique ways of preserving and enhancing the natural world – the trend which has recently been called the phenomenon of "sustainable development".

The formation of aesthetic and ethical feelings in preschool children through the development of natural value orientations goes back to the teachings of Aristotle and Socrates. The deep historical background actualizes the problems of environmental education and the creation of innovative system of childhood ecologization in the third millennium. Active human performance to preserve natural conditions, installation of cultural behavioral foundations in preschoolers insocial environment leads to a necessity to study the problem from a completely different perspective, from the pedagogical theory and educational practice point of view.

The phenomenon of environmental education and various development vectors of this pedagogical problem are analyzed in the studies of E.I. Artamonova, N.N. Balabas, M.A. Vasilyeva, I.V. Gladkaya, A.A. Demidov, N.S. Kramarenko, T.N. Melnikov, A.S. Moskvina, G.P. Novikova, T.S. Komarova, D.V. Smirnov, A.V. Fedorov and others (Artamonova, 2013; Balabas, 2013, Balabas, 2017; Demidov, Smirnov, 2013; Demidov et al., 2019; Fedorov et al., 2004; Gladkaya, 2010; Kramarenko, 2012; Melnikov, 2016; Moskvina, 2019; Novikova, 2015; Komarova, 2016; Vasilieva et al., 2003).

Significant changes in socio-economic conditions taking place recently in society have a major impact on educational processes. The system of preschool education is actively introducing and implementing new educational standards, which brought changes to the structure, content and resource support of educational activities, in the system for assessing educational results. The requirements for the professional competencies of managers and the implementation of the Federal State Educational Standards in the organization are ensured by the presence of the main educational program developed by the preschool organization, including the number and vectors of environmental development of all subjects of educational relations.

The aggravation of environmental problems both in our country and around the world entails intensive educational work on the formation of environmental awareness among the population, and the development of rational use of natural resources. The problem needs to be resolved in the preschool educational organization that is the first link in the system of continuing environmental education. It is difficult to overestimate the role of preschool environmental education in solving the problem of universal ecologization.

The term "ecology", introduced in 1866 by the German researcher E. Haeckel, originally denoted "relations between the organism and the environment". Further, the evolution of the term has undergone numerous changes and in modern conditions, environmental education is designated as a vector of national security and a condition for the sustainable development of Russia and the whole world (quoted by: Melnikov et al., 2018).

The starting point of ecology sustainable development begins in 1992, when the UN Conference on Environment and Development was held in Rio de Janeiro, where the leading experts in this field are called the phenomenon an urgent one for consideration. Then, in 2002, the World Summit on Sustainable Development was held in Johannesburg.

In 2003 (Marrakesh), 2005 (Costa Rica), 2007 (Stockholm) as part of the International Meetings of Experts – a transition was made from consultations to the implementation and formation of a sustainable development advisory committee.

2011 was a landmark year, as the XIX meeting of the Commission on Sustainable Development, held in New York, adopted a 10-year framework program of actions for the sustainable development of all countries of the world.

The following year, 2012, Rio de Janeiro became the central venue of the UN Conference on Sustainable Development for the second time. The Conference overviewed the following topics: green economy in the context of sustainable development and poverty reduction; institutional framework for sustainable development; sustainable production and consumption, etc. In 2015, the following decrees and documents were adopted: The 2030 Agenda for Sustainable Development (Sustainable Development Goals); Paris Agreement under the UN Framework Convention on Climate Change.

The above scientific and practical activities orient the educational sphere towards resolving issues of personality development for each citizen and create a platform for socially important vectors of the formation of the ecological culture of young citizens and the ICT competence of teachers.

The analysis of theory and practice of preschool education has allowed us to identify the contradiction between: the social need for the formation of an innovative system of environmental education through various types of children's activities, taking into account the insufficient ICT competence of teachers and the low quality of scientific and practical recommendations for the use of media in the educational and environmental practice of preschool teachers.

The problem of the article is to study the possibilities of media education in the formation of an integrated system of environmental education for preschool children and the ICT competence of the pedagogical corps of a preschool organization.

The competence of the teacher of preschool education can be ensured through the matrix of professional knowledge and skills, which reflects the scientific rationale that existed during the training. Information communication technologies (ICT) and media education are integral elements of this competency. ICT fasten the process of knowledge transfer, although at the same time they increase the quality of learning, while contributing to a more successful adaptation of a person to constantly changing conditions of social reality.

“UNESCO proposed a structure of competencies that contains six aspects of the ICT competence of the teacher: 1. understanding the role of ICT in education; 2. a curriculum and a system for assessing ICT knowledge; 3. necessary teaching practice using ICT; 4. ability to use the ICT hardware and software; 5. organization and management of the educational process using ICT; 6. professional development in the field of ICT” (quoted by: Sarycheva et al., 2017).

The ICT integration in the field of teacher training should also be determined by understanding the state and prospects of modern information technologies that can be used in the educational process in the preschool organization. The implementation of such training should be based on the enormous potential of media education, which is accumulated by the theory and practice presented by the scientific school of A. Fedorov (Fedorov, Levitskaya, 2015; Fedorov, 2019, etc).

2. Materials and methods

It is important to note, that the pedagogical activity of the teacher in preschool organization transforms the personality of preschool child on the basis of a pre-designed system of influences that allows achieving the desired result at a given stage. Such transformations require teacher to be competent, that is, his professionalism should be based on the unity of theoretical and practical readiness to implement the tasks of pedagogical activity, including the sphere of environmental education.

The purpose of the study is to justify theoretically and experimentally test the methodology for the formation of an integrated system of environmental education for preschool children and the ICT competence of the pedagogical corps of a preschool organization.

To achieve this goal, a variety of pedagogical research methods was used (analysis, generalization, monitoring, methods of qualitative and quantitative processing of empirical pedagogical data, etc.).

3. Discussion

At the present stage of its development, the Russian Federation is actively using various options for media education primarily based on the use of the Internet environment capabilities, mass media, and so on. However, as stated in the studies of modern theorists and practitioners of pedagogical science, our country has not reached the level of foreign, especially the US interconnection and interpenetration of educational, cultural, communication, spiritual and moral, ethical, civil, patriotic and tourist-local history topics that are studied and taught using media and IC technologies (Demidov, Tretyakov, 2016).

At present, the humanization of society is possible due to humanization of education. Having analyzed the Federal State Educational Standard for Preschool Education, it can be said that preschool children receive elementary ideas about the natural world in the framework of the educational field "Cognitive Development", where the following tasks are expected to be solved:

• creation of pedagogical conditions for the formation of elementary ideas in a preschool child about the world of animate and inanimate nature;

• effective educational practice of a humane, emotional-sensual, caring attitude in the surrounding social environment and so on.

The results of modern pedagogical studies proclaim that the development of environmental education should be based on a system-oriented approach that introduces children to elementary principles of nature and its conservation. Unfortunately, the innovative system of effective environmental education has not been created earlier not only for preschool children, but also for all participants of educational relations, including the entire pedagogical corps of the preschool organization and parents. It is of high importance that the continuity between the environmental education of preschool and general educational organizations is maintained.

Environmental education of preschool children is the most important direction in the development of theory and practice of teaching and raising young children. Classically, the environmental education of preschool children has always been regarded as an introduction to the natural world that is taught through children sensory-sensitive orientations.

Environmental education began to develop actively since the 1990s, when prominent representatives of public preschool education (Sakulina, Komarova, 1973 and others) began to initiate the development of new ideological and conceptual forms of children environmental development.

There were various environmental impacts on the education of the personality of a child of preschool age that placed central positions on the fundamental guidelines of the forms and methods of environmental education – observation, tours, games, stories, etc.

Using the ecological potential of game technologies in the educational process of preschool educational organizations allows to create a friendly, joyful environment that promotes the development of a child's imagination and the activation of his psychological and pedagogical processes, including the prerequisites for giftedness and talent. According to our opinion, the positive side of environmental games will contribute to the co-creation of the "child-parent-educator" triangular (Tretyakov, 2017).

The child's favorable attitude to the natural world should be humane in nature, based on moral values and the acmeological system of personal attitudes towards the whole reality surrounding him.

Among the methods of ecological education of preschool children from the perspective of experimental activity, in our opinion, it is advisable to include the following: direct observation method; training method; a method of inducing empathy, exercises in emotionally-positive sympathy for the natural world; method of practical actions; method of persuasion; method of search and problem situations, etc.

We emphasize that it is important to understand the multi-aspect, polyspheric acmeological significance of nature. A preschool child takes the natural world as a foundation for the future development of his material and spiritual forces. Understanding and realizing the real world in unity with spiritual and moral orientations, preschool children build their own attitude towards the natural world.

According to O.V. Dybina, children's creativity is developed in experiments, when they form the ability to independently search for causes and methods of action (Dybina, 2016).

The method of experimentation is amazingly interesting for children, as it can be explained by the fact that in preschool age the visual-effective and visual-figurative thinking dominates the children mind.

Guided by the purpose of the article, we consider the foreign and domestic experience of research on environmental education of preschool children and the formation of ICT competence of teachers in the context of systemic changes in education and digitalization.

A research team from the Hebrew University of Jerusalem in their article "The Environmental Contribution to the Semantic Fluency of Preschoolers" studied semantic fluency among preschool children (Kave et al., 2013). Multivariate regression psychological and pedagogical analysis showed that environmental education and the duration of environmental activities in kindergarten significantly increase semantic fluency. Scientists suggest that environmental factors in preschool age are strongly influenced by semantic fluency.

The results of a longitudinal study of specialists from Australia, Norway, the United States of America, and Sweden were reflected in the work "Genetic and Environmental Impact on Literacy and Language Aspects in Early Childhood: Continuity and the Transition from Preschool to Grade 2" (Byrne et al., 2009). The early literacy and language skills of twins in the United States, Australia, and Scandinavia were studied in a genetically sensitive project. Multivariate analysis showed a significant genetic and environmental match between literacy rates for preschool and primary school children. A longitudinal analysis showed that environmental factors identified at the pre-school stage continued to affect literacy and vocabulary three years later in the 2nd grade, but there was also evidence of the emergence of new environmental factors over a period of time, at least for literacy. According to the results of the study, proposals are made to search for the main innovative areas of environmental-pedagogical activity in the system of preschool and primary general education.

Currently, environmental problems pose a threat to environmental sustainability, such as: global warming, urban air pollution, lack of water, environmental noise and loss of biodiversity, and more. The root cause of these problems is the harmful behavior of a person. Inspiring the interest of preschoolers is crucial in their future environmental awareness. This Taiwanese study discussed the effects of reading between parents and children on children's environmental interests. This article, "The influence of parental education on the environmental education of preschool children: A case study of self-designed picture book", also promotes the integration of environmental education, the holistic educational process of preschool children. The results of this study show that personal qualities, visual attention and the expression of ideas has statistical significance in terms of the educational attitude of children to environmental problems (Fang, 2018).

American researchers have identified and substantiated the moral judgments of preschoolers about environmental damage and human influence on the natural world (Hahn, Garrett, 2017). They discussed if preschoolers considered the environment as a moral problem. In the first study, preschoolers evaluated the morality of actions that harm the environment or another person as non-harmful behavior. Three-year-olds equate behavior that is harmful to the environment with behavior that targets people. Older preschoolers, however, rated behaviors that hurt people as worse than those that harmed the environment. In the second study, we experimentally checked whether it is possible to influence the moral assessments of preschoolers using a job for the future.

Children, perceiving the image of a literary character who has become a victim of environmental harm, evaluate irresponsible behavior from an environmental point of view more strictly than children who perceive a character who has damaged the environment. Taken together, the studies provide preliminary evidence that children under 3 years of age perceive environmental behavior from a moral point of view and we may conclude that these early judgments are malleable.

The work "Ecological Feature and Children's Ecological Experience" proves the mandatory nature of environmental education from the very early stages of development of young children (Corraliza, Collado, 2019). Until recently, the study of environmental beliefs and attitudes was focused on adults. Nevertheless, it is necessary to understand the environmental consciousness of children, as it may allow future generations accept the requirements of environmental protection. Researchers emphasize the importance of environmental experiences in childhood for the development of pro-environmental relationships. They discuss various data on environmental awareness of Spanish children, measured using the New Ecological Paradigm scale and the

children's environmental perception scale. According to the study, Spanish children show an average level of environmental awareness. In addition, the authors of the article propose a model that describes four environmental profiles of activity: eco-oriented, environmental lounge, utilitarian and techno-oriented. In conclusion, the value of the experience of children's communication with nature for its protection of children from external threats is indicated.

Environmental education conveys knowledge and creates experience for changing beliefs, attitudes and, most importantly, behavior. An important discussion question on the deepest motivators of human behavior is posed by the US authors in the work "The Importance of Connecting with Nature in the Assessment of Environmental Education Programs" (Frantz, Mayer, 2014). Theory and research suggest that feelings associated with someone or something motivate protective and selfless environmental behavior. This article examines a large body of research demonstrating that being connected with nature is an important predictor of environmentally responsible behavior for children. The authors demonstrate the complex relationship of man between nature and actual conservation behavior (the phenomenon of sustainable development). It follows that the promotion of children's connectivity with nature should be the goal of environmental education programs and, therefore, should begin with the period of preschool childhood.

Thus, the analysis of studies on the issues of environmental education of children allows us to conclude that the foreign trend in the development and formation of environmental principles should be carried out from early childhood and involve various educational media resources. Foreign scientists emphasize the inextricable relationship of man with the natural world and the problem of technologization of society, the solution of which must be started from preschool age, which is consistent with the results of research by the authors of this article.

According to M.E. Vayndorf-Sysoeva and M.L. Subocheva, "the introduction of digital technologies, the emergence of a digital educational environment, digital tools, and digital footprints determine the development of digital education terminology. Currently, domestic pedagogical science and practice does not yet have a clear, unambiguous interpretation of new terms related to the development of digital education. Discussion of the content, structure, and basic characteristics of these terms is devoted to forums, conferences and sessions of the scientific community, in which members of the government also participate" (Vayndorf-Sysoeva, Subocheva, 2018).

In our opinion, the effective development of the system of environmental education for preschool children cannot be carried out without the formed ICT competence of teachers. Let us analyze the views of foreign and Russian scientists on the issue.

The results of a study aimed at determining the ICT socio-ethical competencies of Filipino teachers determine the level of competence in the field of social and ethical use of ICT among teacher in Central Visayas (Philippines) (Marcial, 2017). The study used a questionnaire based on the Philippine National ICT Teacher Competency Standard. The results come to the conclusion, that the level of competence in the field of ICT in the social and ethical fields among educators is rather "good". The study explains that respondents have the opportunity to explain and discuss the problem, but did not experience real social and ethical practices in ICT. In addition, there is a significant correlation between the level of competence in the field of ICT in terms of social and ethical aspects and the age of the respondent, his status, and type of educational organization, background, Internet access and ownership of desktop computers, smartphones and laptops.

Faced with a society that constantly uses mass media, it is necessary to determine the relationship between users and meansmass media. In other words, it is necessary to understand how information and communication technologies and media competence are interconnected. Based on the study carried out by scientists in the article "Media Competence of Teachers and Students of Compulsory Education in Spain", the interconnection of these concepts is inextricable and the application of one or another concept is related to the context. However, it is also worth saying that it is medical competence in the presenttime is acquiring a more important development trend than information and communication technologies (Ramarez-Garcia, Gonzalez-Fernandez, 2016).

Representatives of the capital city of Moscow and St. Petersburg scientific schools presented the main elements of ICT in the structure of a professional standard for teachers in their new study (Yarmakhov et al., 2018). The article provides a detailed overview of the basic framework underlying the development of professional standards for teachers, in terms of ICT competency.

Scientists focus on the development of an ISTE community ecosystem based on a standard life cycle for students, teachers, trainers, IT teachers, and school administrators. They analyze the mechanism for translating ICT competency standards into educational policies based on the approach proposed by UNESCO. In addition, the mechanisms of translating the framework of the standards of competence of a teacher in the field of ICT into national educational systems are investigated.

Another study, made by Belgian scientists, explores the perception of limitations and critical success factors in the development and implementation of online courses in adult education (De Paepe et al., 2019). This article studies the perceptions of educators and providers about the limitations and crucial success factors in developing and implementing online learning. The focus is on learning Dutch in adult education in Flanders. Based on conducted semi-structured interviews with teachers, results were obtained that show that the main alleged constraints in the development and implementation of an online program are negative beliefs about the effectiveness of online education, costs, lack of technical and pedagogical support and insufficient skills of teachers in the field of ICT. The main prospective success factors, in their opinion, are course design, technological capabilities, (technical, financial and pedagogical) support, students' skills and attitudes, as well as the competencies of designers of educational organizations.

Researchers from Northern Ireland studied teachers' use of digital technology at lessons of a small island (Roulston et al., 2019). Teachers are increasingly integrating ICT into formal education, targeting to integrate technology into the process of teaching and learning. However, an important expectation associated with the integration of ICTs is that educators model their own practice and also develop digital skills and competencies among future members of the teaching society. The authors, trying to test these expectations, report on a converging mixed research methodology that consisted of twelve interviews with educators, as well as a series of questionnaires that were distributed among four teacher education providers in Ireland and four in Northern Ireland. The data obtained indicate that, although, there are gaps in best practices and some individual models of good practice, it is clear that there is limited consistent integration of ICTs within providers of teacher education. The fact defines new vectors for the subject of discussion.

Some scientists believe that the relevance to addressing the problem of ICT competence of teachers is explained by the problem of informatization of modern society, the need to create a single information space, the creation of new competencies that a modern teacher should have, to increase qualification requirements and professional pedagogical activity; the need to establish the strategic goal of turning a country into a global intellectual state with the predominant development of disparate intellectual and knowledge-based material sectors. Carried out a study by specialists of the People's Republic of China confirmed the effectiveness of the developed author's methodology for the formation of the ICT competence of teachers, the results of which are currently being implemented in various educational institutions in China (Chenet et al., 2017).

Now we will move on to the results of a study aimed at the influence of information and communication technologies on human learning processes, the so-called "dark side of digitalization" (Petrauc, Popescul, 2019). In academia and the media, information and communication technologies are usually regarded as the main intermediary in the learning process. Since ICT facilitates access to information and knowledge, regardless of geographic area and area of interest, and makes a significant contribution to the development of various human skills and competencies, its impact in the learning process throughout life is generally recognized as positive. On the other hand, digitalization is fraught with some problems that arise both at the level of individuals and community level. Modern educational organizations more often offer digital screens, laptops for teachers or tablets for each student, seeking to improve the educational process or making it more attractive. This leads to the replacement of traditional way of learning by new technological approaches. Students speak less, but write more; they don't remember anything, they have a browser where they can find all the necessary answers or solutions that can be easily googled. This study examines the impact of digitalization on human thinking, trying to figure out how trends such as big data, information overload and fake news affect human intelligence, ability to understand, amount of attention, active presence in educational communities, etc. Based on an in-depth review of the literature on this topic, some solutions proposed for educators and suppliers of e-learning software are formulated as a consistent adaptation of attitudes and educational

materials. The ways of providing the information and program functions necessary to turn the so-called "dark" effects of ICT into brighter ones are defined.

It is worth noting that "the main stages in the implementation of most media educational approaches for dealing with pedagogical tasks of various kinds are as follows: gaining knowledge about the history, structure, language and theory of media (educational component); development of the perception of media texts, activation of imagination, visual memory, development of various types of thinking (including critical, creative, imaginative, intuitive), skills for understanding ideas (moral, philosophical problems, etc.); development of creative practical skills on the material of the media" (Fedorov, Novikova, 2002).

Thus, we can say that in the theory and practice of preschool education, the need has ripened for research aimed at identifying the role, place and inextricable pedagogical connection between the development of environmental education of preschool children and the formation of ICT competence of teachers acting as effective providers of knowledge to the children's world. The results of this research are presented in the next section of the article.

4. Results

Systemic changes taking place in all areas of educational life create the conditions for revolutionary breakthroughs. The system of preschool education, as one of the most flexible education systems, that answers the challenges of tomorrow, is inextricably linked with digitalization. "In modern psychological and pedagogical literature, digitalization or digitization is understood as the process of converting information into a digital (that is, machine readable) format in which information is organized into bits. The result is a representation of an object, image, sound, document or signal (usually an analog signal) by creating a series of numbers that describe a discrete set of its points or samples. Thus, digitalization is one of the many processes that ensure the development of technologies, education, economics, etc. However, despite the fact that digitalization is only a special case of other modern processes, it influenced (or contributed) to the emergence of seven revolutions that we are witnesses of" (Komarova, 2018).

The analysis of modern educational conditions shows that digitalization and the introduction of media education is inevitable in the system of preschool education. In this regard, we present the results of a study aimed at identifying the level of environmental education of preschool children and the level of ICT competence of teachers. The development of the world at the preschool stage of development of the child's personality takes a special form of development, where environmental education plays an important role, filling it with moral, humanistic content. This provision makes it necessary to assess the level of formation of a humane attitude to nature among preschool children, as an integral element of the entire system of environmental education of preschool children.

We determined the following criteria for environmental education among preschool children – cognitive, emotional and practical components.

Testing methods to identify the level of environmental education of preschool children gave the following results.

Techniques: "Awonderful walk"; "Joy and affliction"; "The forest thanks and argues".

The following levels were identified depending on the quality of the assignment and the number of points scored (the average score shows the level of environmental education of preschool children according to each of the criteria).

In accordance with the high level of environmental education of preschoolers (16-18 points), preschool children should have a high ecological outlook and distinguish the living world from the nonliving; and also understand that there are seasonal changes.

The average level (10-15 points) is characterized by the fact that children approximately understand and represent the animal world. Live animals are predominantly animals.

Low level (9 points or less). Preschool children of this level are characterized by an unstable attitude towards animals and plants without a pronounced positive orientation.

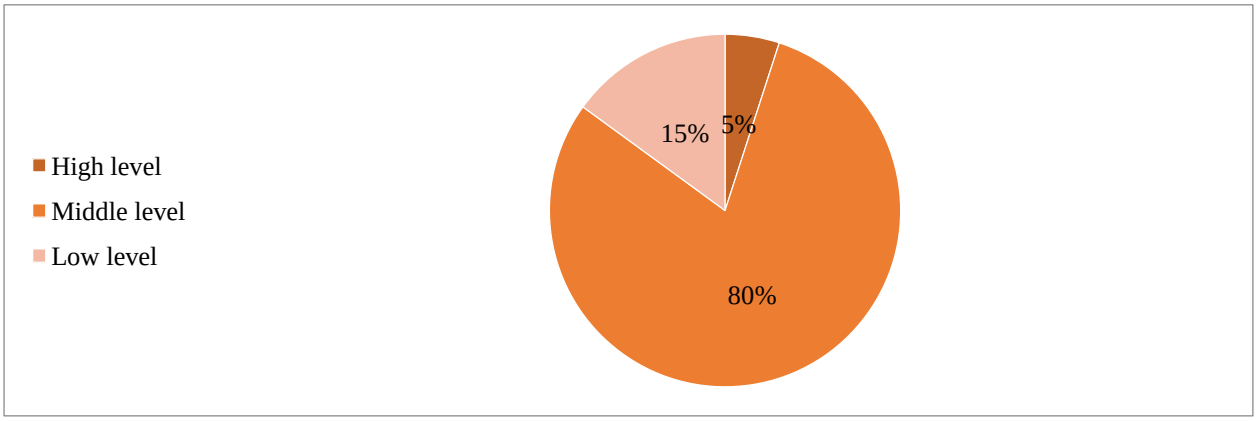


Fig. 1. Levels of environmental education of preschool children

As we see from the analysis of Fig. 1, the average level of environmental education prevails among preschool children.

The results obtained indicate that incomplete knowledge about the laws of nature, its objects and their features affect the lack of knowledge of children, how and why nature should be protected. This fact predetermined the choice of using experimental activity in the development of a humane attitude to nature, and the need to form a system of preschool environmental education on the basis of this type of activity.

Experimenting in preschool education is one of the main ways to study the surrounding reality. Further developing the purpose of this article, we present the results of a study aimed at identifying the level of ICT competence of modern educators.

The study involved 50 teachers who mastered the course "Fundamentals of computer literacy and the use of ICT in solving professional problems".The purpose of the course: to develop the knowledge and skills of teachers in the field of ICT in education, ensuring the formation of a general user (basic) ICT competency in working in an ICT-rich environment.

Tasks of mastering the course:

• introduce safety measures when working on a computer;
• introduce a personal computer device and additional devices;
• help to master the basic techniques of working on the Internet;
• help to master the basic means and technologies of creating and transforming information objects;
• show the possibility of applying the acquired knowledge and skills in teaching practice;
• introduce self-education technologies using ICT tools.

Upon completion of the course, the teacher must:

know:

• safety measures when working on a computer;
• personal computer device and additional devices;
• basic methods of working on the Internet;
• purpose and capabilities of office applications (word processor, spreadsheet editor and programs for the preparation of electronic presentations).

be able to:

• use ICT tools to increase the productivity of their labor;
• use networked automated information systems to record attendance, store estimates and prepare reports;
• use the basic means of creating and transforming information objects;

systematize ready-made software products and media resources for a particular educational subject area (annotated hypertext list, labels);

• use commonly used means of network communication and cooperation (social networks and virtual educational environment).

own:

• basic methods of working on the Internet (information retrieval technology, e-mail, cloud technologies);

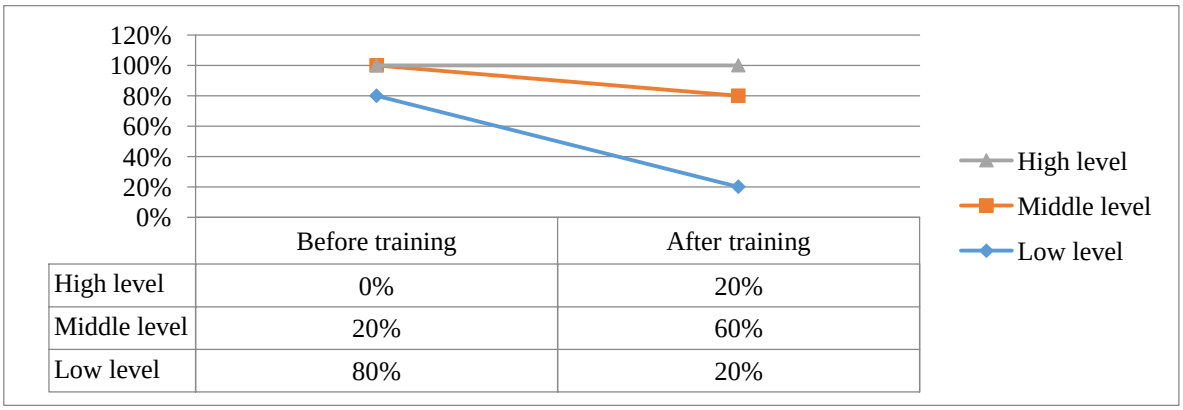
• fixed assets and technologies for creating and transforming information objects (office applications);

• technology of self-education (distance learning at the IOC advanced training) via the Internet.

The training course "Fundamentals of computer literacy and the use of ICT in solving professional problems" consists of three modules:

1. ICT hardware and software;
2. The basic techniques of working on the Internet;
3. Means and technologies for creating and transforming information objects.

The results of the study are presented in the Fig. 2 below.



	Before training	After training
High level	0%	20%
Middle level	20%	60%
Low level	80%	20%

Fig. 2. The results before and after training

The analysis of the results of the study revealed that, due to the developed methodology for the formation of ICT competence of teachers in non-formal education, the level of ICT competence has grown significantly: the percentage increase of a high level was 20 %, the percentage increase of an average level was 40 %, and the percentage of a low level decreased by 60 %.

Even with detailed design and successful approbation of the course, constant monitoring of the effectiveness of the continuous educational process is required, which inevitably is followed by adjustment, updating of training materials, the choice of other teaching methods and etc. This brings us to the idea that pedagogical activity in the conditions of non-formal lifelong education is largely innovative, experimental in nature.

Thus, the research proves that there is a continuous connection of the development of environmental education of preschool children with the formation of ICT competence of teachers.

5. Conclusion

The environment is constantly changing. The increasing number of natural disasters, periods of fluctuations in warming and cooling, various types of weather conditions and many others, people should be aware of what types of environmental problems our planet faces every minute. Some of them are small and affect only individual ecosystems, while others dramatically change the landscape of the Earth.

Preschool children do not have psychological adaptation skills to environmental crises and problems; when they encounter them, they feel sadness, fear and helplessness. It is in our power to help them overcome negative emotions by directing them into the mainstream of cognition and preservation of the world around us using "green" and media educational technologies.

The present study was devoted to the urgent problem of modern education - the development of humane attitude to nature in preschool children and the determination of the relationship between the ICT competences of teachers who act as fairways in the natural world.

A humane attitude to nature is characterized not only by a system of specific ideas about the environment as an ecosystem, but also by the productive, socially significant activity of children in the natural environment, active and interested care for plants and animals, as well as the presence of sensory impressions that give rise to personal experiences that will be transformed in the future regarding.

Experimental activity is a universal mechanism for implementing the basic tasks of environmental education, taking into account the individual characteristics of each child.

In the framework of the experimental work, we were convinced that, like any activity, child experimentation requires comprehensive guidance from a teacher who attracts children to do experimental activities, introducing each child to the natural world; the teacher involves parents in the process of environmental education of children, building an active interaction with them; enriches the subject-developing environment in order to carry out humanistic ally directed experimental activities of children in the natural environment.

We believe that it is necessary to develop a plan of experimental children's activities in nature, based on innovative pedagogical principles, which will be discussed in the next article.

In addition, in accordance with the goal set in this work, the following tasks were solved:

• analysis of scientific and methodological literature allowed to identify the structure and content of ICT competence of the teacher;

• a methodology for the formation of the ICT competency of the teacher was developed;

• developed tools for the formation and diagnosis of the level of the ICT competence of the teacher, and etc.

In conclusion, we note that the process of formation of the environmental education (Demidov et al., 2019) of preschool children and the ICT competence (Chen et al., 2017; Gálik, 2017; *Vrabec,* 2016) of the teacher is developing and continuous. As a result, the teacher should have educational and pedagogical level of ICT competence with an orientation towards the environmental focus, that is, to be able to master specialized technologies and environmental resources in accordance with the requirements for the content of a particular educational field, as well as form a willingness to implement them effectively in educational environmental activities of a modern preschool organization.

References

Artamonova, 2013 – *Artamonova, E.I.* (2013). The concern of the international pedagogical community about the quality of human potential: a strategic approach in the light of the realities of the 21st century. *Pedagogical education and science*, 2: 20-24.

Balabas, 2013 – *Balabas, N.N.* (2013). To the question of the relationship between the concepts of "text" and "discourse". *Education. Tongue. The science. Culture*. Elektrostal: 88-91.

Balabas, 2017 – *Balabas, N.N.* (2017). Virtual excursion as an innovative method of teaching foreign languages. *Philological Sciences. Questions of theory and practice*, 5 (2): 162-164.

Byrne et al., 2009 – *Byrne, B., Coventry, W.L., Olson, R.K., Samuelsson, S., Corley, R., Willcutt, E.G., Wadsworth, S., DeFries, J.C.* (2009). Genetic and environmental influences on aspects of literacy and language in early childhood: Continuity and change from preschool to Grade 2. *Journal of Neurolinguistics*, 3; 219-236. DOI: 10.1016/j.jneuroling.2008.09.003

Chen et al., 2017 – *Chen, F., Gorbunova, N.V., Masalimova, A.R., Birova, J.* (2017). Formation of ICT-Competence of future university school teachers. *Eurasia journal of mathematics science and technology education*, 8: 4765-4777.

Corraliza, Collado, 2019 – *Corraliza, J.A., Collado, S.* (2019). Ecological Awareness and Children's Environmental Experience. *Papeles Del Psicologo*, 3: 190-196. DOI: 10.23923/pap.psicol2019.2896

De Paepe et al., 2019 – *De Paepe, L., Zhu, C., Depryck, K.* (2019). Development and implementation of online Dutch L2 courses in adult education: educators' and providers – perceptions of constraints and critical success factors. *Innovation in language learning and teaching*, 3: 277-291. DOI: 10.1080/17501229.2018.1462369

Decree..., 2018 – *Decree of the President of the Russian Federation* (2018). On national goals and strategic objectives of the development of the Russian Federation for the period until 2024. [Electronic resource]. URL: https://rg.ru/2018/05/08/president-ukaz204-site-dok.html

Demidov et al., 2019 – *Demidov, A.A., Melnikov, T.N., Moskvina, A.S., Tretyakov, A.L.* (2019). The Organization of ecological education of per-school children by means of media literacy education: theory, national policy, scientometrics and vectors of development. *Media Education*, 59(4): 470-481.

Demidov, Smirnov, 2013 – *Demidov, A.A., Smirnov, D.V.* (2013). A new vector of social partnership in the development of local history, tourism and environmental education in the

information society. *Bulletin of the Academy of Children and Youth Tourism and Local History*, 3: 44-52.

Demidov, Tretyakov, 2016 – *Demidov, A.A., Tretyakov, A.L.* (2016). Centers of ethical and legal information and media education on the basis of the school library – an innovation in the implementation of the Federal State Educational Standard and infrastructure for the development of the information and legal culture of children and youth. *Media Education*, 2: 21-33.

Dybina, 2016 – *Dybina, O.V.* (2016). Cognitive-research activity of children. *Preschooler. Methodology and practice of education and training*, 1: 24-30.

Fang, 2018 – *Fang S.-C.* (2018). The influence of parental education on the environmental education of pre-schoolers: A case study of self-designed picture book. *Journal of Baltic Science Education*, 17 (2): 187-199.

Fedorov, 2019 – Fedorov, A. (2019). Schools and universities in audiovisual media: experts' opinions. *Communication Today*, 10 (1): 110-122.

Fedorov, 2019 – *Fedorov, A.* (2019). The Heritage of Yuri Lotman, Umberto Eco and Vladimir Propp in the context of media literacy education. *Media Education*, 2: 243-248.

Fedorov et al., 2004 –*Fedorov, A.V., Novikova, A.A., Chelysheva, I.V., Karuna, I.A.* (2004). Media literacy of future teachers in the light of the modernization of the educational process in Russia: a training manual. Taganrog: Kuchma Publisher House, 188 p.

Fedorov, Levitskaya, 2015 – Fedorov, A., Levitskaya, A. (2015). The framework of media education and media criticism in the contemporary world: the opinion of international experts. *Comunicar*, 23 (45): 107-115.

Fedorov, Novikova, 2002 – *Fedorov, A.V., Novikova, A.A.* (2002). The main theoretical concepts of media education. *Bulletin of the Russian Humanitarian Scientific Foundation*, 1: 149-158.

Frantz, Mayer, 2014 – *Frantz, C.M., Mayer, F.S.* (2014). The importance of connection to nature in assessing environmental education programs. *Studies in Educational Evaluation*, 41: 85-89. DOI: 10.1016/j.stueduc.2013.10.001

Gálik, 2017 – *Gálik, S.* (2017). Influence of cyberspace on changes in contemporary education. *Communication Today,* 8 (1): 30-38.

Gladkaya, 2010 – *Gladkaya, I.V.* (2010). The formation of the ecological worldview of university students in the dialogue of generations. *Dialogue of generations: socio-pedagogical perspectives*. St. Petersburg: 242-247.

Hahn, Garrett, 2017 – *Hahn, E.R., Garrett, M.K.* (2017). Preschoolers' moral judgments of environmental harm and the influence of perspective taking. *Journal of Environmental Psychology*, 53: 11-19. DOI: 10.1016/j.jenvp.2017.05.004

Kave et al., 2013 – *Kave, G., Shalmon, M., Knafo, A.* (2013). Environmental contributions to preschoolers' semantic fluency. *Developmental Science*, 1: 124-135. DOI: 10.1111/desc.12010

Komarova, 2016 – *Komarova, T.S.* (2016). The greatest educators and psychologists of the world about the giftedness and abilities of children. *Pedagogical education and science*, 5: 10-13.

Komarova, 2018 – *Komarova, I.I.* (2018). The Future of Preschool Education in the Digital Age. *Modern Preschool Education. Theory and practice*, 8: 16-25.

Kramarenko, 2012 – *Kramarenko, N.S.* (2012). The study of anonymity in the self-realization of adolescents in the Internet environment. *Bulletin of the University of the Russian Academy of Education*, 3: 32-39.

Marcial, 2017 – *Marcial, D.E.* (2017). ICT social and ethical competency among teacher educators in the Philippines. *Information Technologies and Learning Tools*, 1: 96-103. DOI: 10.33407/itlt.v57i1.1533

Melnikov et al., 2018 – *Melnikov, T.N., Moskvina, A.S., Komarova, I.I.,Tretyakov, A.L.* (2018). Environmental education of preschool children. Moscow: Information and Publishing Department of Moscow Region State University.

Melnikov, 2016 – *Melnikov, T.N.* (2016). Innovations in the education system of the People's Republic of China in 1990-2000. *Pedagogical education and science*, 6: 138-143.

Moskvina, 2019 – *Moskvina, A.S.* (2019). Informatization of additional education in the modern world. *Information and communication technologies in the modern educational space*. Moscow: 127-132.

Novikova, 2015 – *Novikova, G.P.* (2015). Actual problems of the implementation of FGOS DO at the present stage. *Science and School*, 6: 40-48.

Petrauc, Popescul, 2019 – *Petrauc, A.-M.G., Popescul, D.* (2019). The Dark side of digitalization: information and communication technology influence on human learning processes. *New technologies and redesigning learning spaces*. Bucharest: 116-123. DOI: 10.12753/2066-026X-19-085

Ramarez-Garcia, Gonzalez-Fernandez, 2016 – *Ramarez-Garcia, A., Gonzalez-Fernandez, N.* (2016). Media competence of teachers and students of compulsory education in Spain. *Comunicar*, 49: 49-57.

Roulston et al., 2019 – *Roulston, S., Cowan, P., Brown, M., Austin, R., O'Hara, J.* (2019). All aboard or still at check-in? Teacher educators' use of digital technologies: Lessons from a small island. *Education and information technologies*, 6: 3785-3802. DOI: 10.1007/s10639-019-09951-x

Sakulina, Komarova, 1973 – *Sakulina, N.P., Komarova, T.S.* (1973). Graphic activities in kindergarten. Moscow: Education. 208 p.

Sarycheva et al., 2017 – *Sarycheva, L.V., Sen, N.I., Syrina, T.A.* (2017). Correspondence of the ICT competence of higher education teachers to the requirements of a professional standard. *European Social Science Journal*, 6: 369-379.

Sarycheva et al., 2017 – *Sarycheva, L.V., Sen, N.I., Syrina, T.A.* (2017). Correspondence of information and communication technologies of the competence of higher school teachers to the requirements of a professional standard. *World of Science*, 3: 23.

Tretyakov, 2017 – *Tretyakov, A.L.* (2017). Environmental and legal education of students in the implementation of the State program "Patriotic education of citizens of the Russian Federation for 2016-2020". *Bulletin of the Academy of Children and Youth Tourism and Local Lore*, 1: 16-24.

Vasilieva et al., 2003 – *Vasilieva, M.A, Komarova, T.S, Gerbova, V.V, Komarova, I.I.* (2003). The program of education, training and development in kindergarten. *Preschool education*, 1: 12-19.

Vayndorf-Sysoeva, Subocheva, 2018 – *Vayndorf-Sysoeva, M.E., Subocheva, M.L.* (2018). "Digital education" as a system-forming category: approaches to definition. *Bulletin of Moscow State Regional University. Series: Pedagogy*, 3: 25-36.

Vrabec, 2016 – *Vrabec, N.* (2016). Is media literacy still one of the priorities for policy makers? *Communication Today*, 7 (2): 100.

Yarmakhov et al., 2018 – *Yarmakhov, B.B., Sotnikova, A.L., Patarakin, E.D.* (2018). Basic Frameworks of ICT in the Structure of Professional Standard for Teachers. *Psychological Science and Education*, 3: 67-76. DOI: 10.17759/pse.2018230306