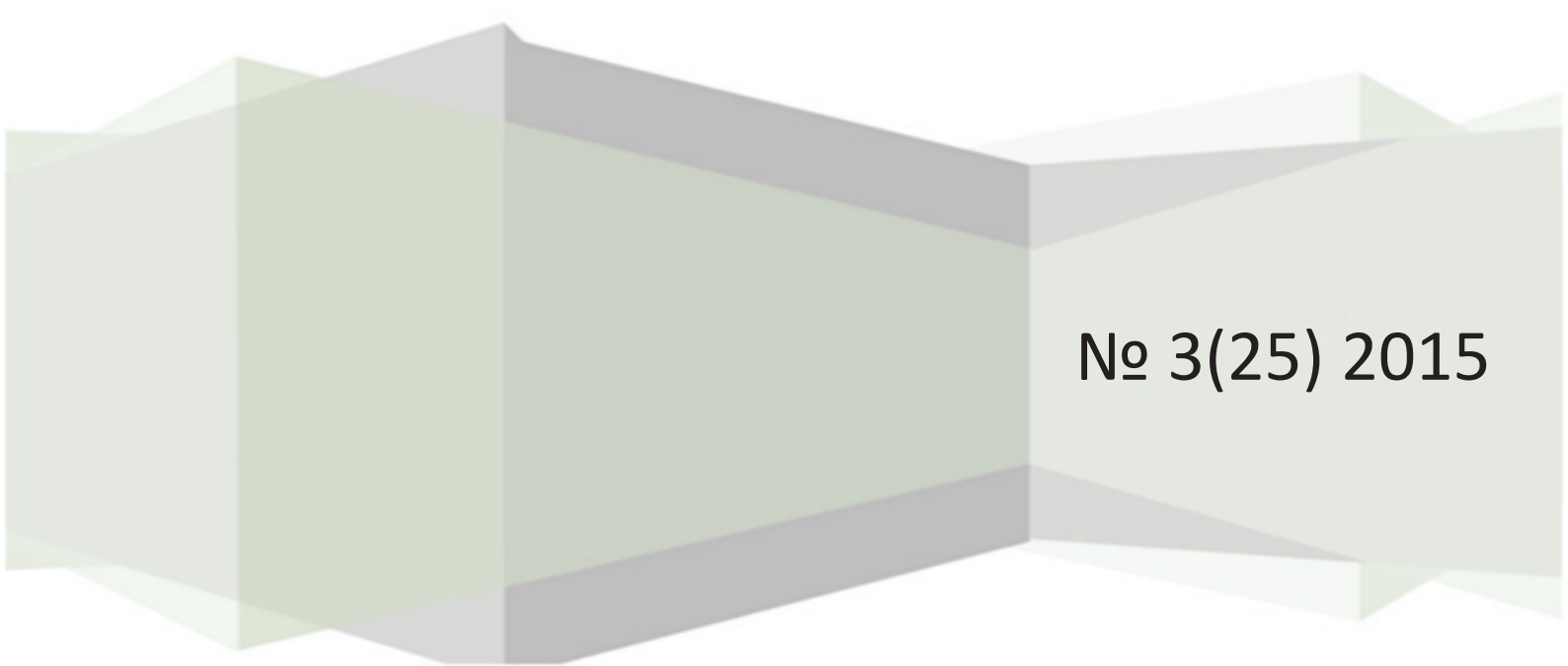


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“The Role of Science in Society”
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Universal Learning Activities in Science Lessons as Means of Developing Secondary School Pupils' Creative Potential

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Key words and phrases: natural cycle; creativity; universal learning activities.

Abstract: This article examines types of universal learning activities of secondary school pupils in science lessons aimed at the developing creativity.

Today, the development of research and production technologies requires the growth of innovative component in human activities and puts forward new challenges for modern system of education - to educate people able to creatively solve scientific and technical problems. This can explain the growing interest in creative activities, which, on the one hand, are fundamental manifestations of personality, and on the other hand, they are necessary for strengthening human identity [3].

It is obvious that education requires new approaches to be incorporated in the national educational standards of the second generation of the Russian Federation and directed to the formation of highly educated, intellectually developed individuals with a holistic view of natural-scientific picture of the world. Currently, the role of scientific knowledge is difficult to overestimate – it is not the only determinant of technological progress, but also an important cultural component of the system of values of modern civilization [4, p. 8]. Therefore, the problem of teaching science remains the key problem of school education.

Natural sciences include the following subjects: physics, chemistry, biology, geography, astronomy, ecology. Each of these sciences has its substantive content, structure, research methods. Studying one of these disciplines, we must not forget that the world is coherent and unified, and the development of personality in the system of education is achieved primarily through the formation of universal learning activities (ULA), which create conditions for independent mastery of knowledge, skills and competencies.

Universal learning activities are grouped into four main blocks:

- 1) personal;
- 2) regulatory, including self-regulation;
- 3) cognitive, including logical, cognitive and symbolic;
- 4) communicative activities.

Personal activities make learning meaningful, teach students to solve problems, linking them with real-life purposes and situations. Personal activities are aimed at cognition, research and adoption of values and meanings that enable learners to shape moral rules, make personal judgements, develop their position in life in relation to the world, other people, oneself and

the future. Regulatory activities teach learners to manage educational and training processes by setting goals, planning, monitoring, correcting their actions and assessing their progress. A gradual transition to self-governance and self-regulation in learning activities provides a basis for future professional education and self-improvement. Cognitive activities include action research, search and selection of necessary information, its structure, modeling, logical steps and operations, ways of solving problems. Communicative activities provide opportunities for cooperation, they teach learners to listen and understand their partners, plan and consistently implement collaborative activities, assign roles, mutually control each other, be able to negotiate, debate, to express their thoughts, respect, and cooperate with peers. Learning implies the ability to collaborate effectively with the teacher and peers, ability and willingness to engage in dialogue, seek solutions, support each other.

The introduction of creative tasks in the lessons will help learners to develop universal learning activities and educate a person who lives in a constantly changing environment [1]. The development of creative potential of students, ability to combine creativity and intelligence and develop talents are at the core of inner strength and fulfillment.

When designing a lesson, it is necessary to identify the starting level of development of universal learning activities in students. Table 1 distinguishes types of universal learning activities of students, aimed at fostering information competence of students. These learning activities

Table 1. Learning activities of secondary school pupils

Universal learning activities	Learners' activities
ULA: planning	The student plans activities to complete the task: <ul style="list-style-type: none"> • The student develops (together with the teacher) "indicative framework" for the activity. • The student uses the "indicative framework" to perform the activity. • The student determines the content of additional training to complete the activity. • The student determines independently the amount of additional training to complete the activity. • The student plans his / her work in a small group (study or design). • The student selects the most effective way of tackling when performing tasks with multiple solutions. • The student determines steps to be used in solving the problem. • The student participates in project work, the results of which are estimated in collaboration with the teacher.
ULA: monitoring and evaluation	The student monitors and evaluates activities, makes corrections on the basis of the evaluation and considers the nature of errors: <ul style="list-style-type: none"> • The student compares the activity or a separate operation with a physical sample. • The student compares the result with the finished sample. • The student develops assessment criteria together with the teacher. • The student develops assessment criteria together with the teacher. • The student uses differentiated assessment. • The student distinguishes between monitoring of the result and monitoring of the method of completing the task. • The student distinguishes between evaluation of the result and evaluation of the method of completing the task. • The student uses self-evaluation by specified or established criteria. • The student produces a predictive assessment of the possibility of completing the tasks given by the teacher. • The student compares self-evaluation with the teacher's evaluation. • The student presents independently the results for public assessment by peers and the teacher.

Continuation of Table 1

Universal learning activities	Learners' activities
ULA: visual and symbolic tools	<p>The student uses symbolic and visual aids to create models of the studied objects and processes; works out solutions to learning and practical tasks:</p> <ul style="list-style-type: none"> • The student uses models to solve specific problems. • The student uses different methods of modeling. • The student uses a universal activity applicable to the solution of a particular problem. • The student converts model for setting new learning objectives.
ULA: problem-solving	<p>The student puts and formulates the problem and generates the algorithms to solve problems:</p> <ul style="list-style-type: none"> • In a new situation, the student realizes that the already known steps (algorithm) are not applicable. • In a new situation, the student starts looking for a new solution. • In a new situation, the student adapts the known method to new conditions. • The student solves problems that require overcoming of stereotypes, finding a new solution.
ULA: group work	<p>The student works with peers in a small group, takes into account the position of other people; justifies his / her position; coordinates different points of view:</p> <ul style="list-style-type: none"> • Working in a small group, the student is aware of his role and acts in accordance with that role. • Solving problems in the group, the student expresses his agreement or disagreement with the opinions of others. • Solving problems in a group, the student expresses his point of view. • Solving problems in a group, students coordinate different points of view and come to a common opinion during the discussion. • During the solution of the problem, the student provides good reasoning for his decisions. • The students share functions and roles in a collaborative activity. • The students ask the teacher and classmates about the missing information. • The student compares the activity or separate operation and its result with a prepared sample. • The student evaluates the activity or a separate operation and its result in accordance with the selected criteria.
ULA: information search	<p>The student carries out the search of information:</p> <ul style="list-style-type: none"> • The student accesses needed information to perform academic tasks using textbooks, encyclopedias, reference books (including digital). • The student accesses needed information to perform academic tasks in open information space. • The student uses different types of editors to proofread a created text.
ULA: ICT tools	<p>The student writes, records information using ICT tools and exchanges information in the educational process through network resources:</p> <ul style="list-style-type: none"> • The student creates a written description of objects, phenomena, events. • The student presents objects, phenomena, events in the form of diagrams, graphics, tables, charts. • The student uses available technology: voice recorders, video cameras, e-mail or webcams, maintains a written discussion on the Internet forums. • Planning the search of information, the student formulate search queries, uses search engines, digital resources, Internet sites.

can be used to design varied tasks that meet the requirements of developing teenagers' creative potential.

In the process of learning, students acquire skills that will be in demand not only at any stage of schooling, but also in later life. They form the core that will allow further socialization and adaption to contemporary society.

Today, every teacher is responsible for the educational achievements of learners, their ability to adapt to changing socio-economic conditions of modern society. Solving modern educational problems, each teacher creates his / her pedagogical system. My path is the path of cooperation between the teacher and the student, their collaborative creative work.

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Универсальные учебные действия на уроках естественнонаучного цикла как средство развития творческого потенциала учащихся основной школы

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Ключевые слова и фразы: естественнонаучный цикл; творческий потенциал; универсальные учебные действия.

Аннотация: В данной статье рассматривается деятельность учащихся основной школы по типам универсальных учебных действий на уроках предметов естественнонаучного цикла посредством развития творческого потенциала.

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The Possibility of Developing the CAD Subsystem for Analysis of Scattering Characteristics of Hollow Structures

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Key words and phrases: hollow structure; scattering; CAD.

Abstract: In this paper the solution of scattering problems of electromagnetic waves on metallic structure is given. The system of integral equations for surface currents was applied. The recommendations for building the CAD subsystem are given, within which there is the possibility of designing technical objects with hollow structures, having the required values of the scattering characteristics.

The analysis of various modern technical objects that are associated with the processes of scattering of electromagnetic waves shows that they in many cases includes a hollow structure having a complex structure. Work on the analysis and synthesis of such structures must be carried out using models and approaches that allow to achieve a very small errors [1].

When getting information on different objects that are associated with a radar range, the experimental studies can lead to high costs, in terms of materials and time. On this basis, it is necessary to apply the approaches aimed at mathematical modeling, allowing an assessment of the scattering characteristics of objects with acceptable accuracy.

Consideration of scattering characteristics of different objects of equipment should be carried out with the involvement of a large number of approaches.

In many cases, high-frequency diffraction classical asymptotic methods are used; but they do not always allow describing the surface with absorbent materials, as well as objects of complex configuration.

Depending on the characteristics of the surfaces of objects, different approaches can be used [2].

1. Using the symmetry of the object or the methods for solids of revolution.
2. Analytical description of the object's surface.
3. The partition object on the simplest components.
4. The use approximation techniques for surfaces that make up the object.

The method of integral equations can be regarded as a universal method, enabling the analysis of a wide class of objects containing in its structure a hollow structure.

This method can be proposed as the basis for constructing a mathematical module for com-

puter-aided design (**CAD**), in the study of complex electrodynamic objects. Then there are opportunities to expand significantly the classes of objects associated with the scattering of electromagnetic waves.

We conducted the analysis for a hollow structure which comprises an absorbent coating on its surface.

We will consider the case of E-polarization, and the observation point is $E(x_f, y_f)$. Point (x_f, y_f) is placed for the cross section S of the absorbing coating on the metal surface. Based on the fact that the boundary conditions are applied, there is a record of the system of integral equations. We are talking about Fredholm equations of the 1st kind [3].

$$\begin{aligned}
 E_0(x_f, y_f) + \int_{L_x} p_1(t) W_1(r) x(t) dt + \int_{L_m} u_1(t) G_1(r) x(t) dt &= 0, \text{ for } (x_0, y_0) \in L_x \\
 \int_{L_x} p_2(t) W_2(r) x(t) dt + \int_{L_m} u_2(t) W_2(r) x(t) dt &= 0, \text{ for } (x_f, y_f) \in L_x \\
 - \int_{L_m} u_1(t) W_1(r) x(t) dt + \int_{L_m} u_2(t) W_2(r) x(t) dt - \int_{L_x} p_1(t) W_1(r) x(t) dt + \\
 + \int_{L_x} p_2(t) W_2(r) x(t) dt &= E_0(x_f, y_f), \text{ for } (x_f, y_f) \in L_u \\
 - \frac{1}{2} u_1(\rho) - \frac{1}{2} u_2(\rho) + \int_{L_m} u_1(t) \frac{\partial W_1(r)}{\partial n} x(t) dt - \int_{L_m} u_2(t) \frac{\partial W_2(r)}{\partial n} x(t) dt - \\
 - \frac{i}{4} \int_{L_x} p_1(t) \frac{\partial W_1(r)}{\partial n} x(t) dt - \int_{L_x} p_2(t) \frac{\partial W_2(r)}{\partial n} x(t) dt &= \frac{E_0(x_f, y_f)}{\partial n}, \text{ for } (x_f, y_f) \in L_u.
 \end{aligned}$$

In the above equations, p_1, u_1 indicate the potential density on the outside for circuits related to metal L_x and absorbing coating L_u , respectively; p_2, u_2 refer to the values of densities of potentials to the inner sides of the contours; for the incident electromagnetic wave we used the notation $E_0(x_f, y_f)$; the angle of incidence of the electromagnetic waves is θ , it is also the angle of observation; $W_1(r)$ is a two-dimensional Green's function related to the infinite domain, with the corresponding to the wave number $k = 2\pi/\lambda$; the length of the electromagnetic wave in free space λ ; symbol $W_2(r)$ refers to the two-dimensional Green's function associated with an infinite domain, with the corresponding wave number $k = (2\pi/\lambda)\sqrt{\epsilon\mu}$; the distance from the observation point to the starting point is r ; for the Lamé L ratio we used the notation x .

The specified system is solved by the method of moments. An effective system is to use basic functions related to the total area, and then get a smooth solution of the problem.

For the calculation of the scattered electromagnetic field it is necessary to use the appropriate formula [2].

Fig. 1 shows the contact structure of the CAD subsystem, on the basis of which it is possible to carry out the design of objects, containing in its composition a hollow structure.

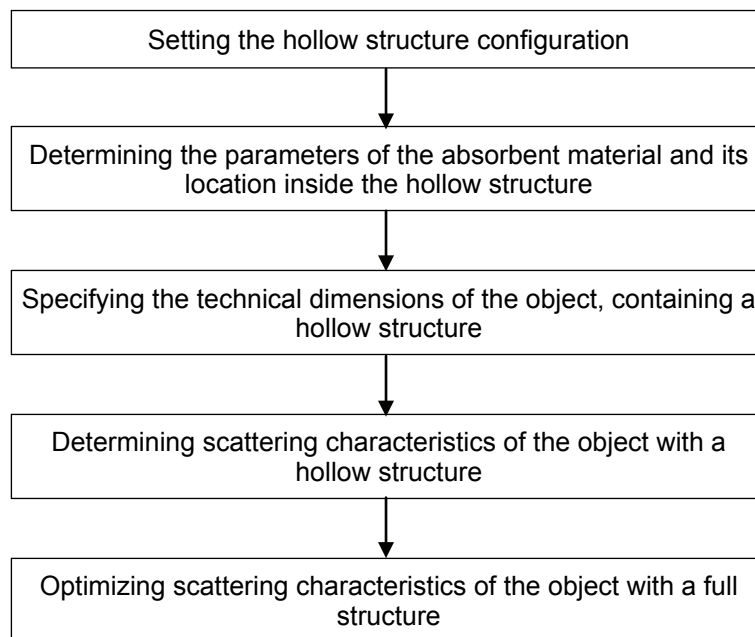


Fig. 1. Specifics of CAD subsystem to assess scattering characteristics of objects with a hollow structure

As a result, the obtained scattering characteristics values depending on the angle of observation will be stored in databases, and then transferred to the general CAD when building objects with different desired characteristics [4; 5].

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**Возможность разработки подсистемы САПР
для проведения анализа характеристик рассеяния полых структур**

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Ключевые слова и фразы: полая структура; рассеяние; САПР.

Аннотация: В работе проведено решение задачи рассеяния электромагнитных волн на металлической полыхой структуре. Для поверхностных токов применялась система интегральных уравнений. Даны рекомендации по построению подсистемы САПР, в рамках которой есть возможность проектирования технических объектов с полыми структурами, имеющих необходимые значения характеристик рассеяния.

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Means for Shaping New Intellectual Property under Integration of University and Engineering Company

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Key words and phrases: check valves; swing check valves; pipeline.

Abstract: The authors focus on the efficiency of patent search, functional and technological analysis and brainstorming as tools of new intellectual property formation using the example of swing check valves.

Petrozavodsk State University together with AEM-Technology engineering company is currently involved in the complex project: "Establishment of high-tech production of slider and wedge stamp-welded valves for enterprises of nuclear and heat power production and oil-and-gas industry using nanostructured protective coating". A condition of this project is development of new technical solutions on the improvement of swing check valves for main pipelines and submission of patent applications [1 – 2].

At that, one of the key work stages is patent search for detailed technical object study. Patent documentation related to the object in question, technological processes where it is engaged, as well as scientific and technical literature (scientific articles, monographs, catalogues, advertising leaflets, scientific theses, conference materials, etc.) are studied as a result of patent search. On the basis of the collected information analysis, we discovered ways of improvement of the object in question, and the object itself was classified according to various attributes (structural, functional etc.). Technical level and development trends of the technical object in question, as well as ways and methods of obtaining a certain technical result were established using the collected information analysis.

The next work stage – the development of new patentable innovation solutions aimed at the technical object improvement – can be started after systematization of information collected during patent search, establishment of technical development level and design evolution stages.

Practice shows that one of the most efficient ways of searching for new technical solutions is a method based on using functional and technological analysis and synthesis of patentable solutions [3]. One of the specific features of this methodology is creation of technical object development matrix, which is built according to classification attributes formulated at the first stage based on analysis of scientific and technical information collected during the patent search. This matrix is further complicated by adding cells indicating possible technical object development directions. After establishing possible technical object development directions, technical design solutions for putting them in practice are searched for. At that, the Functional and Technological Analysis and Synthesis Method [4] combines very efficiently with the Brainstorming Method [5], when a team of experts in various fields is gathered (researcher, patent expert, designer, tech-

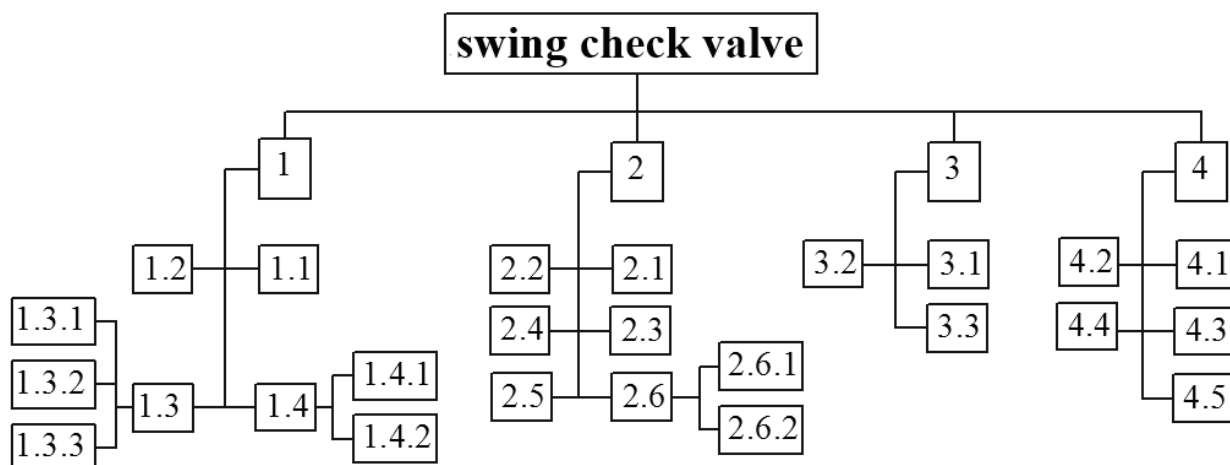


Fig. 1. Swing check valve development matrix fragment

nologist, operations expert, marketer etc.), and they suggest various methods of the technical object development in the course of the discussion.

The method is examined on the case of the improvement of a technical object – a swing check valve for main pipeline serving nuclear power plant, oil pipeline and gas pipeline – within the framework of complex project implementation. A fragment of the swing check valve development matrix is shown in fig. 1.

The following symbols are used in Fig. 1: 1 – operational features enhancement; 1.1 – self-cleaning of valve and seat surfaces from particles; 1.2 – operation at increased differential pressures and temperatures; 1.3 – hydraulic flow resistance factor decrease: 1.3.1 – use of the working fluid flow energy for holding the valve in open position; 1.3.2 – body internal surface geometry, flow passage dimensions and shape; 1.3.3 – valve suspension point alteration; 1.4 – reparability improvement: 1.4.1 – use of separable connections instead of permanent ones; 1.4.2 – separable body; 2 – reliability improvement: 2.1 – valve spindle and body lugs durability improvement; 2.2 – decreasing valve vibrations caused by working fluid flow; 2.3 – damping of valve hydraulic shock at working fluid flow shutoff; 2.4 – structure components material selection; 2.5 – prevention of valve jamming in any position; 2.6 – increasing of the “valve – seat” pair cyclic durability: 2.6.1 – decreasing of valve and seat interacting surfaces wear intensity; 2.6.2 – amortization of valve and seat collision at the moment of closing; 3 – valve leak-proof improvement: 3.1 – even bearing between the valve and seat; 3.2 – ensuring self-cleaning of valve and seat work surfaces; 3.3 – installation of an additional disc on the valve which is pushed to the seat by a spring; 4 – producibility improvement: 4.1 – certain units structure simplification; 4.2 – certain parts and units producibility improvement; 4.3 – simplification of certain parts and units interconnection; 4.4 – overall dimensions decreasing; 4.5 – material content decreasing.

Seven new intellectual property objects have been created using the described methodology that includes swing check valves matrix construction. They are under patenting now.

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**Инструменты формирования новой интеллектуальной собственности
при интеграции работы университета и инжиниринговой компании**

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Ключевые слова и фразы: запорная арматура, затвор обратный, трубопровод.

Аннотация: Показана на примере обратных затворов эффективность патентного поиска, функционально-технологического анализа и метода «мозговой атаки» как инструментов формирования новой интеллектуальной собственности.

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UDK 004

Preservation and Updating of Objects of Cultural Heritage Using Multimedia Technologies

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Key words and phrases: cultural heritage; virtual museum; exhibition; information technologies; multimedia technologies.

Abstract: The authors discuss the concept of cultural heritage from the perspective of multimedia approach to processing data on museum collections. The authors stress the importance of conservation of objects of cultural heritage using multimedia technologies.

The concept of “cultural heritage” is widely used in the conceptual and terminological apparatus of history, science, legislation, public administration and services. The formation of this concept goes back to the XV century [1]. In Russia, the questions of conservation of cultural heritage were raised in the reform era of Peter I, however, the scientific interest in antiquities, began to take shape only in the XVIII century [7]. In the 1960–1970, the international community has done some work, which resulted in the adoption of Convention of “On Protection of the World Cultural and Natural Heritage” by the 17th UNESCO General Conference XVII in 1972. The concept of “cultural heritage” was disclosed, and a detailed description of the objects of cultural heritage for its types was given [3].

One of the areas of conservation, updating and presentation of cultural objects to society is the creation of museum collections and operation of museums [4; 5]. The foundation of any museum’s collection is the museum object. Up to the 1990s, in the vast majority of museums in the world, with rare exception, the traditional technologies, which were developed at the end of the previous century, were applied to processing data on collections of museum objects. Although computer facilities were used for these purposes, manual processing of information such as traditional (paper) or machine-readable carriers were mainly employed [4].

A new stage began in the first half of the 1990s, when word processing programs were replaced by multimedia technologies, which allow representing text data, images, sound, video, animation. The tasks solved by the system using multimedia technologies, covered virtually the entire spectrum of the main activities of the museum: stock registration, scientific, restoration, exposition and exhibition, publishing activities of the museum [4]. The representation of the museum and its activity in the Internet is private development of this direction. Currently, there are two types of museum sites on the Internet: information resources giving an idea of the existing museums (websites-business cards) and virtual museums (containing information about the museums and their exhibitions, including multimedia materials about the real museum objects). These groups are generalized under the terms of “virtual museum”, “digital” or “electronic mu-

seum" [2].

The first group of websites prevails by quantity over the second one, and, as a rule, is an information resource that contains information about a particular museum. They often contain superficial, generalized information about exhibitions and exhibits. The second group is Internet-resources, containing facts arranged in a structure, describing specific objects (artifacts) of a real museum. This structure is the exposition of "a virtual" museum, or the projection of a real-life exhibition in the virtual space, or the one created specifically for web publishing. Thus, the information resource of a real museum and a virtual museum often represent different information resources.

A number of authors [2; 5], specifying the concept of a virtual museum mean a website, representing a collection of text documents, photos and multimedia materials about the exhibits. Application of the hypertext and hypermedia (**HTML**) technology in the creation of this kind of resources, when you browse through web-documents (pages), creates an illusion of visiting various expositions, museum "rooms", etc. There is also an extended version of this kind of website. Panoramic photographs are used as multimedia materials: Planar and virtual panorama. The disadvantages of this approach are limited viewing of scene by photographer, relatively expensive equipment, etc. If necessary, it is impossible in any way to change the exposition of objects of cultural heritage.

Every cultural object is a certain array of information; in the first place, it is the properties and appearance of this object. The object also contains information about the age or place of creation. When using classical methods of preservation of cultural objects and information associated with them, there is a number of difficulties connected with the preservation of museums, visiting exhibitions, exchanging and copying of information.

It is necessary to develop a new approach to the conservation of cultural objects using the latest achievements and developments in the field of computer technology (multimedia) and information systems. This approach consists in transfer of the information array and visual images of cultural heritage objects in the virtual space in order to implement the basic functions and mission of museums using modern technologies for processing and storage of digital information based on the concept [6] of Information Security of cultural heritage.

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**Сохранение и обновление объектов культурного наследия
с помощью мультимедийных технологий**

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Ключевые слова и фразы: культурное наследие; виртуальный музей; выставка; информационные технологии; мультимедийные технологии.

Аннотация: Рассмотрена необходимость сохранения объектов культурного наследия с точки зрения мультимедийного подхода к обработке данных о музейных коллекциях. Отмечается важность использования мультимедийных технологий для сохранения объектов культурного наследия.

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UDK 378

Developing Entrepreneurship Education in Russia

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Key words and phrases: entrepreneur; entrepreneurship education; entrepreneurial activity; higher education institution.

Abstract: This article is devoted to the development of entrepreneurship education in Russia. The authors considered factors and ways of developing entrepreneurship education in Russia, using structural analysis and comparison of experience in the field of entrepreneurship education in the leading universities of the country. The acknowledgement of entrepreneurship as the potent economic power proves that there is a direct connection between the level of entrepreneurial activity and entrepreneurial education.

Entrepreneurship education is a global trend in developed and developing economies. It is a well-known fact that individual entrepreneurial skills and the quality of human capital are the necessary factors of economic progress. Entrepreneurship researchers and entrepreneurship education stakeholders (entrepreneurial universities, business-schools) state that it is important to develop entrepreneurship education. Entrepreneurship education can be an instrument to increase entrepreneurial activity and a powerful force to accelerate economic growth.

Therefore, the purpose of the article is to analyze the trends of developing entrepreneurship education in Russia. The interest in entrepreneurship education in Russia has grown lately. This fact is supported by some studies. Answering the question if the received education helped entrepreneurs to set up their business, only 8.3% of respondents who have their own business said that the received education did not help them in developing their business. The rest of the respondents believed that their education helped them and was useful [1]. According to the research conducted by "Barometer of business activity", Russia is on the 14th place among 20 countries in terms of entrepreneurship education (in comparison, South Africa is on 11th, the United States is on the 3rd, France is on the 1st place) [2].

The analysis of practical and theoretical research materials was based on the method of comparison, structural and functional analysis, and a statistical method. That allowed for deeper understanding of the essence of the problem and made it possible to determine the directions of developing entrepreneurship education.

Entrepreneurs are able to recognize new business opportunities, and have enough knowledge and experience to implement them in practice. These people have strong creative thinking skills and are able to take responsibility, create something new. They have an ability to turn

Table 1. The Analysis of Higher Education Institutions in Russia in entrepreneurship education

Higher Education Institutions (HEI)	Business education	Professional development programs
Lomonosov Moscow State University	Master of Business Administration (MBA)	Program Basics of entrepreneurial activities
Saint Petersburg State University	Executive MBA	Program Project management in social entrepreneurship
Bauman Moscow State Technical University	Master of Business Administration (MBA). General Program	–
Moscow Institute of Physics and Technology	–	Program Technological Entrepreneurship and Innovative Business Development
Lobachevsky State University of Nizhni Novgorod	–	Program Innovative Entrepreneurship

ideas into action. They can implement innovation and take risks, have the ability to plan and can achieve these goals. These qualities are developed through education, work and social activities. They are necessary in business and employment.

Therefore, at the present stage of professional education reforms it is crucial to switch to practice-oriented training of future entrepreneurs [3]. Russian researchers [Plekhoва, Bednyj, Grudzinskij, 2011] consider the basic approaches to the development of innovative model of practice-oriented teaching and learning as an educational business environment within entrepreneurship university [4]. Recognizing this fact, we must say that the issue of developing entrepreneurship education in Russia is not well studied.

As Zhang et al. [5] noted, "...entrepreneurship plays an important role in development by incubating technological innovations, increasing economic efficiency and creating new jobs". We agree with Blenker et al. [6] that "entrepreneurship education requires learning methods, pedagogical processes and frames for education, which universities at the moment have not mastered". Such changes, however, involve parallel transformations of didactics, pedagogy and university context.

Entrepreneurship in the educational context will help students become more flexible, self-confident, and independent, learn to make decisions, plan, solve problems, communicate with partners, have social skills and learn how to manage projects and processes. Students who are interested in entrepreneurship education have a greater intention to start-up.

Considering the trends of developing entrepreneurship education in Russia, it is necessary to analyze the factors that influence it. They are:

- Financial support. The availability of financial resources and support, including grants and subsidies to new and developing businesses, financial business community.
- Government policy. Regional and federal government policy and its practical application

in relation to taxation and government regulation and control.

- Education and professional training in creating and managing new, small and emerging businesses.
- Introduction of scientific and technical developments, creating new business opportunities, as well as availability of research and development facilities for new, small and emerging businesses [7].

We can add the following factors that will contribute to the development of entrepreneurship education.

- Promoting a positive image of entrepreneurship among young people.
- Developing entrepreneurial infrastructure, business incubators, technology parks, venture investment funds.
- Cooperating with leading international universities in entrepreneurship education (participation in international projects on the development of innovative entrepreneurship).
- State support and implementation of special programs in entrepreneurship education.

There is a direct connection between the level of entrepreneurial activity and entrepreneurship education. The survey data demonstrated that entrepreneurship education is in great demand in the education services market. Therefore, it is recommended to develop entrepreneurship education on the basis of collaboration with entrepreneurship universities, promote entrepreneurial practices and seek government support.

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Тенденции развития предпринимательского образования в России

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Ключевые слова и фразы: предприниматель; бизнес-образование; предпринимательская деятельность; высшее учебное заведение.

Аннотация: Статья посвящена развитию предпринимательского образования в России. Авторы рассмотрели факторы и пути развития предпринимательского образования в России на основе структурного анализа и сопоставления опыта в области бизнес-образования в ведущих университетах страны. Признание роли предпринимательства в экономическом развитии страны служит доказательством того, что существует прямая связь между уровнем предпринимательской активности и развитием бизнес-образования.

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UDK 126.47

Current State and Development of Beekeeping in Azerbaijan

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Key words and phrases: beekeeping; economic reform; entrepreneur.

Abstract: This article describes beekeeping as one of the oldest and most environmentally friendly forms of agriculture. The development of this sector is of particular importance in present conditions of food security.

Beekeeping is a branch of agriculture dealing with breeding honeybees and their use in entomophilous pollination of agricultural plants, production and processing of bee products. The development of this sector plays an important role in improving the environmental sphere of the state. According V.M. Niftullaev, "Beekeeping is an important factor in pollination of crops and increasing the productivity of other crops. In this regard, it is necessary to create and develop beekeeping farms in all favorable areas" [1, p. 329].

Beekeeping is one of the oldest and most environmentally friendly forms of agriculture. Its development is of particular importance in the present conditions of food security.

In recent years, the industry has been given special attention, and in accordance with the Presidential Decree of 14 April 2009 on the Approval of the Law of Azerbaijan Republic "On Beekeeping" dated 02 February 2009 in certain regions of the country, conditions were created for the development of beekeeping. The implementation of measures to increase bee colonies and improve their productivity began, the corresponding decisions on the use of advanced equipment and technology were made to create bee farms meeting modern requirements.

Studies show that currently the material base of the industry is outdated; beekeepers feel the lack of basic equipment and materials. The republic has no infrastructure to maintain bee farms. Beekeepers are facing great difficulties in selling their products. Despite the high demand of the population for high quality honey, there are problems with sales and distribution to customers. In this respect, scientific research into organization, production management of beekeeping farms and use of investment and financial sources is acquiring a greater relevance.

The country annually holds fairs for the sale of beekeeping products. The purpose of the fair is the promotion of beekeeping in the country, its wide distribution, development, exchange of experience in this area and finding ways of exporting bee products.

In comparison with other branches of agriculture, the establishment of bee farms requires less cost; it is beneficial in terms of a quick return on investment; it has opportunities for rapid expansion of production and creating environmentally safe working conditions.

In conditions of market economy, functioning of the new economic and property relations makes it possible to predict the broad prospects for development of beekeeping.

Not surprisingly, the International Association of Beekeepers "Apimondia" included a variety

of projects on the development of beekeeping and apiculture in the UN programs.

According to the State Statistics Committee for 2012, there were 225,355 bee families in Azerbaijan. Each bee colony produces an average of 10–11 kg of honey. However, the yield varies mainly due to rain. More than 6,000 people are employed in beekeeping.

Calculations show that the number of bee colonies in the country can be increased by 5 times, and their efficiency can be increased twice. Over the past 5 years, the number of bee colonies in Azerbaijan has increased by 68,276 or 11.3 %. Beekeeping is intensively developing in Zagatala, Shamkir, Belokannskom, Quba, Qusar, Shamakhi and Ismayilli regions.

In recent years, with the use of modern technologies in beekeeping, a greater progress in the development of bee farms has been achieved in the Republic. The country introduced a set of measures to support the development of beekeeping:

- increase in bee colonies;
- improvement of material and technical base of beekeeping;
- organization and breeding of purebred queens;
- development of nomadic beekeeping;
- fight against diseases;
- production, processing, logistics, packaging and marketing of apiculture products.

These measures have resulted in beekeeping becoming a more profitable and promising branch of agriculture.

However, the current state of beekeeping in the country, compared with the global rate is still at a lower level. Every year millions of tons of natural flora nectar is lost, instead of using it to meet the future needs of the population. The solution of a number of existing problems in beekeeping would contribute to its further development.

One of the major factors affecting the development of beekeeping is to create a regional infrastructure and management of the industry.

One of the important tasks of improving productivity in beekeeping is the proper organization of the work to increase the thoroughbred. Thirty-one bee farms operating in the country have made great efforts in this area.

Founded in the city of Mingachevir Beekeepers Association “Cicek”, consisting of 40 beekeepers started extensive work on the development of beekeeping.

State Agency for Agricultural Credits IFAD carries out an international project for the development of beekeeping in our country. In Lerik, Gabala, Kedabek, Yardimli and Khizi regions, where the project is carried out, beekeeping is more developed. In Azerbaijan, there are such public organizations as “Professional Beekeepers,” “The Golden Beehive” and “Mountain Beekeepers”. The Union of Beekeepers was established in 2008. All this contributed to the significant development of beekeeping in the country. The organization and placement of apiaries is of particular importance in the formation of bee farms. Apiary can be created in any environmentally favorable location. For its profitability, it is especially important to have sufficient quantities of honey plants.

In general, the formation and placement of bee farms should be carried out under the following conditions:

- it is advisable to place apiaries near the honey plants;
- it is important to choose the areas to establish hives wisely;
- buying and transportation of bees should be carried out in accordance with established rules and regulations;
- beekeeping sector should be provided with the necessary number of beehives and beekeeping equipment.

In organizing the apiaries, equipment regulating the activities of the farm must be purchased to ensure its normal functioning. The equipment, which is the base of the organization and activity of bee farms, is crucial for the development of bee farms.

Bee farms are one of the most common legal forms of collective entrepreneurship. Beekeeping farms have existed in the world for many centuries, the legal regulation of their activities has undergone a long improvement process.

In our opinion, taking into account the peculiarities of formation of bee farms in the developed market economies, the analysis and the study of their forms and the optimal structure, including experience in business, is important for the development of a comprehensive program and its application in our country, given the national peculiarities.

In the context of a diversified economy, the development of beekeeping as well as other branches of agriculture depends on several factors. These are the factors defined by agrarian reforms and having a direct impact on the production and sales of bee products. Economic activity of bee farms consists of production and delivery to customers.

Crisis in the agrarian economy has had an adverse effect on the quantity and composition of the labor force in beekeeping farms. During the period of economic reforms in the republic (1991–2003), changes in the age frames in beekeeping have led to a decrease in the level of professionalism and specialization, contributing to the increased role of human factor in beekeeping.

Russian scientists A.M. Ishemgulov and G.R. Mirsalimova argue that the work of beekeeping offices in the regions is not aimed at solving strategic and tactical problems of enterprises. However, beekeeping has been developing more rapidly in areas with state control and funding. Therefore, to ensure the development of beekeeping farms it is necessary to carry out state control and financing.

One of the major factors affecting the development of bee farms is sales of bee products. The economic efficiency of beekeeping farms largely depends on the organization of sales and the choice of methods for its implementation. Most employed producers enter the markets through intermediaries, causing loss of significant resources and decreased productivity. To address these shortcomings, we need to strengthen the activities of the newly created Union of Beekeepers and local beekeeping associations in search of efficient solutions.

Compared with the world's beekeeping, the current state of beekeeping in the Republic of Azerbaijan is still at a low level. As noted, the development of beekeeping enterprises requires improving entrepreneurial and creative potential. This is closely connected with the improvement of working and living conditions. Thus, the effective use of human capital and human resources will result in the improvement of the current state and further development of bee farms.

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Современное состояние и развитие пчеловодства в Азербайджане

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Ключевые слова и фразы: пчеловодство; экономическая реформа; предприниматель.

Аннотация: В статье характеризуется пчеловодство, которое является одной из самых древних и экологически безопасных форм хозяйствования. Развитие этой сферы имеет особое значение в современных условиях продовольственной безопасности.

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Possibilities of Modeling Socio-Economic Development of the Region

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Key words and phrases: object of modeling; stochastic approach; self-regulation of the region; socio-economic development of the region; model of the region.

Abstract: The principles of modeling socio-economic development of regions have been formulated; a model of regional development, taking into account internal and external factors has been developed.

The system analysis should be seen as a methodological basis for the implementation of the processes of modeling of socio-economic development of regions. It is necessary for creating an integrated model that reflects a variety of factors and relationships in the real system [1].

If the region is seen as an object of modeling, one has to consider the following features:

- lack of theoretical models for quantitative and qualitative forecasting of the development of regions;
- a high level of uncertainty on the primary data, as these data are not always manageable by researchers (if the impact comes from the external environment) [2].

When carrying out the analysis and modeling the processes in the region it is important to take into account the following:

- the region is represented as a complex structured system with cause-and effect relationships;
- modelling is based on a stochastic approach that implies consideration of systems in conditions of uncertainty and ambiguity;
- the region is a social system with natural and psychological factors. When decisions are made, it is important to take into account the prospects for the future;
- in view of the fact that the region is a dynamic system, it is necessary to carry out the analysis of the processes taking into account the development of its different parts;
- self-regulation of the region takes place in the framework of intra-organizational processes;
- with the development of plans it is important to consider the contradiction between the long-term forecasts and immediate actions; in this regard, their coordination is required.

Decision-making in management should maximize the degree of satisfaction of the needs of those people who live in the region, and improve their standards of living. An appropriate objective function must be built.

The management problem must be considered both at macro and micro levels. It is important to create conditions for the full development of individuals and achievement of an appro-

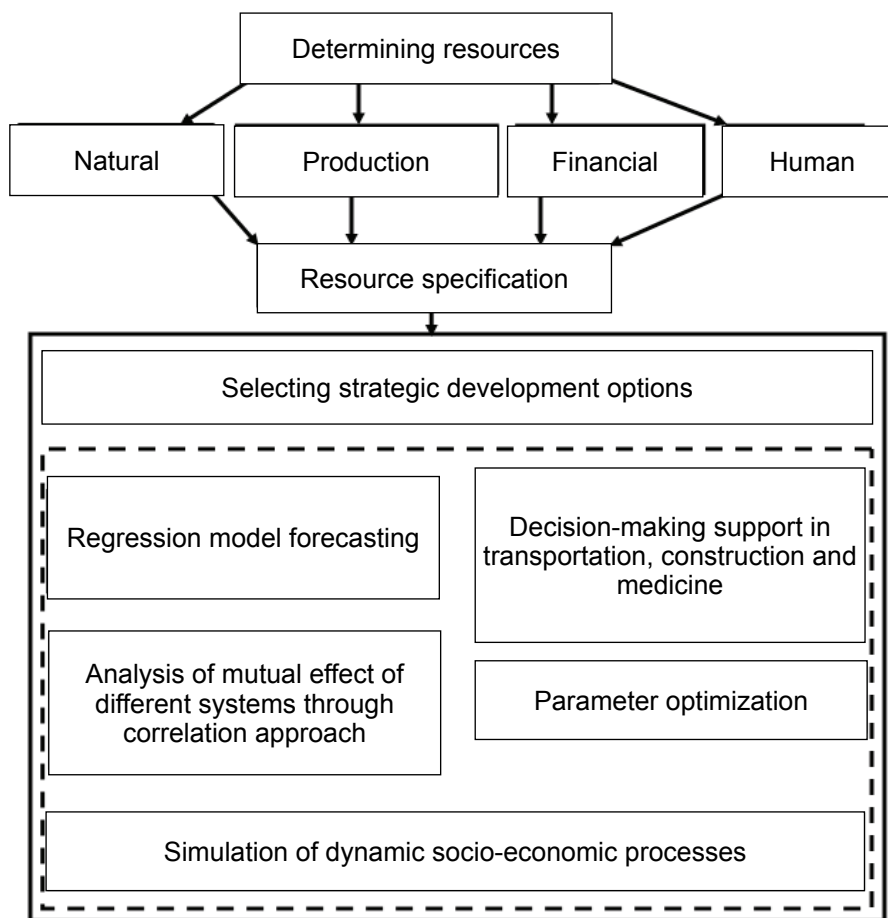


Fig. 1. Model of region's development

appropriate standard of living. This is reflected in the material component and a plurality of human activities [3].

The region can be represented as a focused and multi-purpose system, which has internal and external objects. The internal objects include economy of the organization, production capacity. External objects include ecology, population, external economy.

We consider the example of a system of indicators related to socio-economic development of the region. The socio-economic component of the level of regional development has a dual role: on the one hand, it includes the extensive development of individuals, and on the other hand, it contains the tools to meet the needs of the population in services of social infrastructure.

Indicators are interconnected chains with relevant priorities. Social parameters, such as quality of life, living conditions, working conditions are of maximum priority. The next priority is given to economic parameters.

Indicators are combined into integrated indicators. Socio-economic structures can be assessed on their basis.

Fig.1 illustrates the proposed model of the region.

The natural resources are assessed in terms of their composition, characteristics of their

consumption, and environmental problems. The production resources are investigated from the perspective of the effectiveness of their operation, including the use of innovative technologies. Financial resources are considered in terms of the effectiveness of the credit and investment activities. Human resources are analyzed for potential employment and migration processes.

Resources are detailed by their minimum required components.

In formulating plans for strategic development of the region, it is necessary to use multiple units.

Regression model forecasting makes it possible to evaluate changes in parameters in the near future.

Decision-making support for various systems in the region makes it possible to select the key parameters to be managed.

At such, the mutual effect characteristics for the various systems in management processes are monitored as part of the correlation approach.

Appropriate optimization tools must be used to select the parameters with optimal values.

With the help of modeling, one can build a generalized model of the system and study the dynamics of its development [4].

Differential balance equations, queuing theory and methods of logistics systems based on optimization are used as mathematical tools.

Thus, the application of this model allows investigating the socio-economic characteristics of different regions of the country.

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Возможности моделирования социально-экономического развития региона

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Ключевые слова и фразы: объект моделирования; стохастический подход; саморегулирование региона; социально-экономическое развитие региона; модель

региона.

Аннотация: сформулированы принципы моделирования социально-экономического развития регионов; разработана модель развития региона с учетом внутренних и внешних факторов.

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Reelection of Omar Al Bashir in 2015 and His Influence on the Peace Process in Darfur

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Key words and phrases: Sudan; Darfur; Omar el Bashir; peace process; reelection; conflict; rebels; African Union.

Abstract: Omar el Bashir became the chief of Sudan in 1989 after a military coup. In 1993, he became officially the president of Sudanese state. Since 1993 he has been reelected three times (2000, 2010, 2015). In April 27 2015, Omar el Bashir was reelected for a third term, although since 2003, the region of Darfur has been the theater of indescribable civil war. According to many experts, the conflict in Darfur is considered as the most important humanitarian disaster of 21st century, because during the active moment of the confrontation (2003–2010) from 200 to 400 thousands peoples died and 2 or 3 million became refugees. The present article analyzes the role of Omar Bashir in the explosion of conflict, because he was the chief of state when the conflict in Darfur erupted in 2003. The most important attention is paid to his recent election in 2015 and the impact that this reelection could have on the process in the western region of Sudan – Darfur.

From 2003, Darfur was involved in the civil war. According to some experts, the conflict in Darfur is one of the greatest humanitarian catastrophes of the XXI century, since 200–400 thousand people were killed, and from 2 to 3 million people became refugees or displaced people during the active phase (2003–2010) of the conflict (out of 7.2 million people living in the region) [1]. From the outbreak of the conflict the African Union, the international community and international organizations were mobilized in order to find a way to resolve this military confrontation. However, unfortunately, none of the agreements that were signed between the Sudanese government and Darfur rebels led to the termination of conflict. In fact, the most important requirements of the Darfur rebels was regime change in Khartoum [11]. However, on April 27, 2015, despite the rebels' a requirement west region to change regime in Khartoum, Omar al Bashir was re-elected president of Sudan. Will the re-election of Omar Al Bashir as President of Sudan affect the peace process in Darfur?

April 27, 2015, Omar al Bashir was re-elected President of the Sudan for the third time (2000, 2010, 2015). His re-election raised the question whether Omar al-Bashir will be able to

resolve the conflicts in Sudan, especially military confrontation in Darfur because it is considered the main problem of Darfur.

March 4, 2009 and July 12, 2010, the International Criminal Court issued two arrest warrants to the President of Sudan – Omar al Bashir. Despite the reluctance of Darfur rebels, Sudanese opposition parties and the international community to organize presidential elections in Sudan in 2015, the president of Sudan, Omar al-Bashir decided to organize these elections.

These elections, held 27 April 2015, resulted in his re-election as president of Sudan with 94.5 % of voters [2]. It should be noted that the presidential election was the first in Sudan after the secession and independence of Southern Sudan. But, unfortunately, the re-election of Omar al Bashir in April 2015, taking into account the real situation in the country (the conflict in Darfur, the situation in South Kordofan and Blue Nile), was not seen by many observers as a wise decision with regard to solving the problems in the country. Sudan's main opposition parties refused to take part in the last presidential election, until the war in the western region of Sudan and the country's security problems were solved [3].

Overall, to understand why the re-election of Omar al Bashir was a significant obstacle to achieving peace in the Sudan and, in particular, to the fragile peace in Darfur, it is important to analyze the attitude to the government headed by Omar al-Bashir since the beginning of the conflict in Darfur to date.

Indeed, in 2003, the conflict began in the western region of Sudan between the government in Khartoum and Darfur rebel groups, particularly the Sudan Liberation Movement (**SOD**) and the Justice and Equality Movement (**JEM**). From the very beginning of the military conflict in Darfur in 2003, the government in Khartoum led by Omar al-Bashir decided recruit Arab militias "Janjaweed" rather than negotiate with the rebels in Darfur. According to a report of non-governmental organization on human rights in 2004, it was estimated that between 2003–2004 Sudan's government recruited 20 000 militia "Janjaweed" [5]. This decision of Omar al Bashir and his government to recruit Arab militias showed that the Khartoum authorities had bad faith in Darfur peace plan.

Rebel groups has always perceived President Omar al-Bashir as a threat to the fragile peace in Darfur. In 2004, during the peace negotiations in N'Djamena, the Sudanese government refused to meet the leaders of the Sudan Liberation Movement / Army and the Justice and Equality Movement face to face, because for the government they were bandits, not rebels. As a result, the leaders were presented as intermediaries [1, p. 222–223]. In political terms, it seems that Omar al Bashir specifically refused to meet the rebels in Darfur in 2004, in order to postpone the peace negotiations in N'Djamena. Despite this strategy of the Sudanese Government led by Omar al-Bashir on April 8, 2004 the Agreement on Humanitarian Ceasefire (**SGPO**) and the Protocol on humanitarian aid were signed in Darfur. Unfortunately, the government of Omar al Bashir created an obstacle preventing the implementation of the agreement of April 8, 2004. Implementation of the agreement faced many obstacles, because the governmental delegation insisted on the inclusion of a clause on concentration of rebel forces in certain areas - in parallel with the disarmament of Janjaweed. It is important to note that this clause was added by hand [1, p. 222–223].

However, falsification of N'Djamena agreements by the Sudanese Government delegation was one of the reasons for the intensive resumption of violence between Darfur rebels, on the one hand, and the central government and informal pro-government troops, on the other. Therefore, in order to stop the violence in Darfur, the UN Security Council, despite the reluctance of Omar al-Bashir, on September 18, 2004 Resolution 1564 [14] was adopted. The resolution allowed military intervention of the African Union in Darfur to protect civilians in western Sudan

against “Janjaweed” militants’ abuse. However, two years later, with the support of the African Union in Abuja the Sudanese government and the Sudan Liberation Movement (**ODS**) led by Minni Minawi signed the Darfur Peace Agreement (**DPA**). The agreement was signed on 5 May 2006. In fact, this agreement was considered as a manipulation of Omar al Bashir’s government of two rebel groups: the Sudan Liberation Movement led by Abdel Wahid and the Justice and Equality Movement. Omar al Bashir was not sincere in the negotiations. As a result, the leaders of the rebel groups did not sign the Darfur Peace Agreement [6].

Instead of negotiating with the rebels that refused to sign the Darfur Peace Agreement Omar al Bashir and his Government believed started to arm “Janjaweed” militias. As a result, the violence in Darfur increased. The talks between the Sudanese government and Darfur rebels could have contributed to the implementation of the Darfur Peace Agreement, but, al Bashir decided to resolve the conflict by force of arms.

In 2007, the situation in Darfur deteriorated so much that the UN Security Council adopted a new resolution (Resolution 1769) on the establishment of the African Union and the UN in Darfur on July 31, 2007. From the very beginning of the operation, President Omar al Bashir was strongly opposed to the mission. He said that Darfur did not need the protection of the mission of the United Nations and the African Union [8]. During the presidential campaign in 2015, Omar al Bashir reiterated it to the population of Darfur [8]. In fact, Omar al Bashir considered a joint mission of the United Nations and the African Union as the US intervention for the militarization of Sudan. This mistrust of the Sudanese President to the mission may also explain why all the efforts of the African Union, the UN and the international community to resolve the conflict in Darfur were ineffective.

The position of al-Bashir on the joint operation of the United Nations and the African Union was an obstacle to the peace process in Darfur. However, his recent re-election was unlikely to help him change his attitude toward the mission and contribute to the implementation of the Doha Document for Peace in Darfur (**DDMD**).

Indeed, the cooperation between the United Nations and the African Union to resolve the conflict in Darfur and to counter the Janjaweed activities in western Sudan, in Doha between the Sudanese government and the Movement for the Liberation and Justice resulted in signing a document for peace in Darfur [4].

This agreement was signed on 14 July 2011 with the mediation of the African Union, the UN and Qatar. The document was to be the basis for a comprehensive peace agreement with all rebel groups. However, Sudan Liberation Movement / Army (Abdel Wahid and Minni Minawi) and Justice and Equality Movement did not join in the agreements [13].

The main rebel group in the western region of Sudan did not sign the Doha Document for Peace in Darfur because they believed that the Sudanese government did not provide all the conditions for national reconciliation, in particular: the negotiations between all the Sudanese rebel groups and the government [6, p. 29], as well as regime change in Khartoum [11].

For the rebels of Darfur dialogue and national regime change in Khartoum are the basic positions for the settlement of conflicts across the country. The Sudanese government has always opposed these ideas. Omar al Bashir and his supporters believe the Doha Document for Peace in Darfur, was the best solution to the conflict in the region. President Omar al-Bashir and his government are not ready to retire. You can also note that the Sudanese Government has always refused to conduct general discussions with all leaders of the rebel groups of Sudan [6, p. 29].

In January 2014, President Omar al-Bashir decided on the establishment of an inclusive national dialogue [7]. In August 2014, the National Dialogue Committee announced its plan, and

President Omar al-Bashir was appointed as head of the Committee [9]. The Committee was composed of seven members of the Sudanese Government and seven members of the opposition parties. Unfortunately, the issue of election of the president in 2015 was not included in the plan of the committee. The leaders of opposition parties and rebel groups felt that it was important not to organize elections until all disputes in the country have been solved [9].

In December 2014 in Addis Ababa, negotiations resumed between the Sudanese Government and the largest rebel groups in Darfur – “Justice and Equality Movement” and “Sudan Liberation Movement / Army.” Unfortunately, peace talks in Addis Ababa were postponed [12], as President Omar al-Bashir did not go to the extension of the mandate of the government delegation.

1 April 2015, Abdul Wahid, leader of the Sudanese Liberation Movement / Army urged Sudan to cease its attempts to interact with the Sudanese Government through peaceful means, and instead, to seek a regime change by military means, and an uprising [10].

Despite calls to boycott the elections by opposition parties, rebel groups and the Sudanese civil community, the very difficult political situation of the country, the presidential elections were held, and al-Bashir was re-elected to a new five-year term.

Thus, after analyzing the political context of Sudan, Omar al Bashir’s role in the resumption of conflict in Sudan, and especially the events in Darfur one can say that the re-election of Omar al Bashir to a new five-year term may be an obstacle to the peace process in Darfur. Opposition leaders, rebel groups and civil society consider it as one of the critical events in the western region of the country. This re-election prevents Sudan’s foreign policy because two arrest warrants have been issued against Omar al Bashir.

From another point of view, President Omar al-Bashir could use this new five-year term to solve some of the key problems of the country, namely, the conflict in Darfur. To achieve this goal, Omar al Bashir and her team must ensure the conditions of a true national reconciliation, in particular:

- comply with the national dialogue;
- trust the mission of the United Nations and the African Union in Darfur;
- initiate honest and inclusive negotiations with the rebels of the country.

If Omar al Bashir takes into account these suggestions, the situation in the country as well as in Darfur can change. However, if he remains on their same positions (distrust in the mission, a distraction from the national dialogue), his new term may be perceived as a brake on the peace process in Darfur.

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Переизбрание Омара аль Башира президентом Судана в 2015 г. и его влияние на мирный процесс в Дарфуре

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Ключевые слова и фразы: Судан; Дарфур; Омар аль Башир; мирный процесс; переизбрание; конфликт; Африканский Союз; повстанцы.

Аннотация: Омар аль Башир стал главой Судана в 1989 г. в результате военного переворота. В 1993 г. он стал официально президентом государства Судан. С 1993 г. был три раза переизбран (2000 г., 2010 г., 2015 г.). 27 апреля 2015 г. Омар аль Башир был переизбран на третий срок президентом Судана. Тем не менее, начиная с 2003 г., Дарфур переживает гражданскую войну. По мнению ряда экспертов, конфликт в Дарфуре считается одной из самых значительных гуманитарных катастроф XXI в., поскольку в ходе активной фазы (2003–2010 гг.) этого конфликта погибло от 200 до 400 тыс. человек, а от 2 до 3 млн (из проживающих в регионе 7,2 млн) стали беженцами или перемещенными лицами. В статье анализируется роль президента Судана Омара аль Башира в возникновении этого вооруженного противостояния. Особое внимание уделяется рассмотрению недавнего переизбрания Омара аль Башира и его влияние на мирный процесс в Дарфуре, поскольку лидеры оппозиционных партий и повстанческих групп Судана считают Омара аль Башира главным виновником конфликтов в стране, особенно в Дарфуре.

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