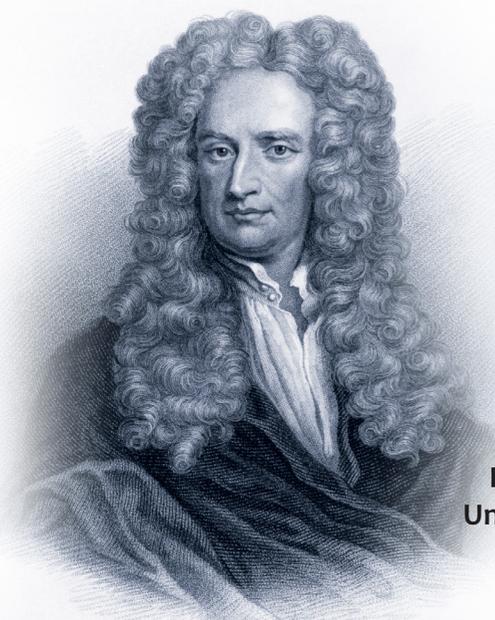




INTERNATIONAL CONFERENCE

**PROCESS
MANAGEMENT AND
SCIENTIFIC
DEVELOPMENTS**



**Birmingham
United Kingdom**

International Conference “Process Management and Scientific Developments”

Birmingham, United Kingdom
(Novotel Birmingham Centre, November 25, 2020)



Proceedings of the International Conference
"Process Management and Scientific Developments"
(Birmingham, United Kingdom, November 25, 2020). Part 2

M67

ISBN 978-5-905695-56-9

These Conference Proceedings combine materials of the conference – research papers and thesis reports of scientific workers. They examines technical and sociological issues of research issues. Some articles deal with theoretical and methodological approaches and principles of research questions of personality professionalization.

Authors are responsible for the accuracy of cited publications, facts, figures, quotations, statistics, proper names and other information.

UDC 330

ISBN 978-5-905695-56-9

©Scientific publishing house Infinity, 2020

©Group of authors, 2020

CONTENTS

ECONOMICS

New perspectives – new tasks

Protsenko Oleg Dmitrievich, Protsenko Inga Olegovna.....8

Quality Management System at an Enterprise in the Radio Electronic Industry

Makolov Vasily Ivanovich.....14

Management of economic and environmental security in the context logistics integration

Muratova Shohista Nimatullayevna.....23

JURISPRUDENCE

On the methodology of using corruption indicators to assess the level of corruption by the prosecutor's office

Zhirnova Inna Olegovna.....28

PEDAGOGICAL SCIENCES

Implementation of the idea of didactic synthesis in the preparation of teachers of the subject area «Natural Sciences»

Dubitskaya Larisa Vladimirovna, Bykova Julia Nikolaevna,
Zolotova Svetlana Nikolaevna.....35

Distance learning, a step forward or backward

Shipovskaya Lyudmila Pavlovna, Andryukhov Nikita Mikhailovich.....41

Neuropsychological technology of people after 60 years

Lezina Valeriya Vladimirovna, Malsagova Maryam Khamatkhanovna.....49

The University Teachers' Competences in the Modern Educational Environment

Danilova Yulia Sergeevna.....56

Learning Ornament in Primary School Fine Arts

Polynskaya Irina Nikolaevna.....63

SOCIOLOGICAL SCIENCES

Russian diaspora as a factor of Russian influence in the “near abroad”

Karnaukhova Marina Vladimirovna, Talina Irina Vladimirovna,
Karnaukhov Vladimir Anatolyevich.....68

Digitalization of the Russian higher education system

Solomatina Elena Nikolaevna.....73

PHILOLOGICAL SCIENCES

L2 phonetics instruction: which English to teach today?

Elena E. Muromtseva.....82

Metaphors in the language of Mansi fairy tales

Panchenko Ludmila Nikolaevna.....88

Difficulties in teaching English at the Multidisciplinary College

Taburchenko Irina Mickhailovna.....94

PHILOSOPHICAL SCIENCES

State Library Institute – University of Library Studies and Information Technologies:

Department of Library Studies and Bibliography (Genealogy of the monographic
reference-information cluster for 90 years: 1930-2019)

Denchev Stoyan Georgiev, Kumanova Alexandra Venkova,
Kazanski Nikola Rachev.....99

Mental metaphysical entity of the science – practice – education in the library-
information sphere

Kumanova Alexandra Venkova, Kazanski Nikola Rachev,
Vasilev Nikolay Kurtev.....106

Philosophy of technology in technogenic society

Popkova Natalia Vladimirovna.....114

ART HISTORY

«Arabesque» of winners

Redko Anatoly Maksimovich.....122

The spiritual potential of the North peoples' circle dances

Lukina Angelina Grigorievna.....129

Producing and technological aspects in design of side door panels Baojun RM-5

Medelets Nikita Aleksandrovich.....141

Evolution of chamber instrumental genre in the work of P.Khindemit in the 1920-30-s
Zhuravleva Olga Ivanivna, Razbeglova Tatiana Pavlovna.....146

CULTUROLOGY

Reflection of the rites of passage in the bear ceremony of the Mansi (Voguls)
Popova Svetlana Alekseevna.....154

MEDICAL SCIENCES

Features of cognitive and personality deficits in opium addicts at the stage of one-year
remission
Lazarev Igor Aleksandrovich, Tsvetkov Andrey Vladimirovich.....160

Features of the structure of dental hard tissues in a region with an increased level of
fluoride in drinking water
Petrushanko Vladymyr Nykolayevych, Lobach Larysa Nykolaevna,
Lyashenko Liliya Ivanovna.....168

Anti-rituximab antibodies in patients with chronic lymphocytic leukemia
Moskalets Oxana Vladimirovna.....175

The bioengineering structure for the treatment of liver failure
Sichkar D.A., Korotkov A.V., Kostyukova S.V., Evgeny Shuman,
Mariya Desyatova, Satonkina O.A., Makeev O.G.....180

Monitoring of autologous mesenchymal stem cells in the patient's body introduced into
the vascular bed of the liver in order to improve its functional state
Kotkas Inna Evgenievna.....189

CHEMICAL SCIENCES

Solar energy and prospects for its development
Zidan Olga Dmitrievna, Habibova Natalia Zamilovna.....193

AGRICULTURAL SCIENCES

Features of growth and development of *Silybum marianum* on North-West of Russia
Naida Nadezhda Michailovna.....198

TECHNICAL SCIENCES

Determination of the design parameters of seals with required properties
Aslanov Jamaladdin Nuraddin, Huseynli Zenfira Seydi.....204

NEW PERSPECTIVES – NEW TASKS

Protsenko Oleg Dmitrievich

Doctor of Economic Sciences, Full Professor, Academic Supervisor of the Department of Marketing and International Cooperation, IMRD
The Russian Presidential Academy of National Economy and Public Administration

Honored Economist of the Russian Federation, Honorary Professor of RANEPA

Protsenko Inga Olegovna

Doctor of Economic Sciences, Full Professor
The Russian Presidential Academy of National Economy and Public Administration

Abstract. *The article is devoted to the problems of the development of the digital economy, new requirements for education, the development of logistics.*

Keywords: *Human capital, knowledge economy, education, logistics.*

The transition to the digital economy is inextricably linked with “human capital”. The content and the very concept of "human capital" was sufficiently succinctly and meaningfully disclosed at the end of the XX century in the works of G. Becker and T. Schultz, who later received the Nobel Prizes [see. 1]. In fact, the concept of "human capital" should be understood as professional skill, the ability to work effectively, which in turn is inseparable from health, well-being of living conditions and a number of other factors. When we talk about "human capital" we believe that it is inextricably linked with new approaches to the level and quality of education, which should take into account and, to a certain extent, predict those fundamental changes that are taking place and will take place in the social order as a result of the revolutionary development of information and communication technologies, robotics, artificial intelligence, quantum computers, etc. We call the whole of the above complex "digital economy", which is based on the development of "human capital"- the main component of which is the "knowledge economy". This area includes, along with education, the latest areas of IT-technologies, biotechnology, healthcare, robot-

ics, etc. In developed countries, this complex is more than 35% of GDP. It should be emphasized that GDP growth due to the "knowledge economy" sector is provided by more than 50% [1]. In fact, we are talking about the reorientation of the economy from the resource component to the knowledge economy, in which the "digital economy" is the supporting "skeleton". Consequently, the development of the "knowledge economy" is a determining factor in the development of the "digital economy". In connection with the above, it was emphasized that educational issues, including information and communication technologies, are of particular importance. However, based on the need to develop the "digital economy", the training of specialists in the field of IT technologies should be increased many times over. This entails serious requirements for universities, including the need to retrain the teaching staff. A number of serious factors should be taken into account in the consistent implementation of the digital economy. Its consistent implementation is intended to provide fundamentally new management principles at various levels. Standardized data in digital form, integration and elimination of a number of duplicating functions, and their possible improvement are used as a management tool. In the "digital economy" we are not talking about the "digitization" and automation of old technologies associated with the preparation and adoption of decisions and the issuance of relevant documents. In the digital economy, Big Data platforms and technologies are being formed that are based on a regulatory framework that eliminate disunity, and in some cases, their incompatibility due to the departmental management approach. In fact, a number of functions performed by certain governing bodies, including a number of links of intermediaries, are withering away.

Why are we talking about a fundamentally new management system? By integrating information flows based on common platform standards, it is possible to implement fundamentally new management digital services for specific management entities. The speed and efficiency of decisions are increased due to the receipt of any information instantly. Data unified and harmonized on the basis of standards can be used for interstate information interaction between countries based on existing information exchange protocols. It should be emphasized that when building digital services, the main advantage is a one-time presentation of information in the platform. Digital transformation is fundamentally changing the organization of business processes. The business process organization model is being transformed, acquiring a new quality that is difficult to predict at present. One thing is clear that the practical implementation of the principles outlined requires serious unification, standardization, elimination of duplicate func-

tions, based on a deep intradepartmental and interdepartmental study of information flows. This requires the training of highly qualified managers, of various levels, specialists in various industries, to deeply study the content of the functions and tasks performed.

The development of the "digital economy" puts forward requirements for the implementation of work processes in the company. It is necessary to proceed from the fact that employees need to have a certain level of mathematical thinking, to be able to assess the situation in terms of its impact on the activities of the company.

The introduction of the digital economy is a technical project, but on the other hand, it is the formation of a new strategy for the development of an enterprise, a company, and the national economy as a whole. In fact, we are talking about quite serious changes in the organizational structure, management methods, in the cultural, legal and social aspects. It should be emphasized that this is a cyclical process that affects the style and nature of the activities of various groups, incl. it is associated with the release of a number of layers of workers, the expediency of whose activities is no longer. Moreover, a number of workers will to a certain extent will hinder (or already hinder) the creation of new forms of management. This is not a simple social issue - either the development of new forms and methods of management is associated with the retraining of a number of employees. [3]

The introduction and development of the "digital economy" puts forward a number of social, legal, psychological and religious aspects related to the release of a significant number of employees.

Special attention should be paid to a number of new requirements for the education system, which are put forward by the "knowledge economy". It is quite obvious that the process of "tuning" education to new challenges is not one-step, but certain directions of its further development are obvious. In our opinion, when training specialists of various specialties - financiers, logisticians, marketers, managers, etc. training programs should include disciplines related to specific implementation with the widespread introduction of the "digital economy". It is the specialists of a particular industry who can and should determine which functions, in conjunction with digital information, should be integrated. In combination with digitalization, the student must be familiar with new forms of organization and business management, assess social consequences, legal problems, analyze the psychological consequences of the introduction of the digital economy.

Due to the rapid development of science, knowledge, there is a need to continuously increase their "mental baggage" - that is "Longlife learning".

During his creative activity, a person is forced to repeatedly change his specialization. In a figurative comparison, we can talk about "a bouquet of different specialties." It should be emphasized that the boundaries between economic and humanitarian sciences are being erased. In the context of the "digital revolution", specialists with systems thinking, psychological and social cultural understanding of the new requirements associated with the development of the "knowledge economy" will be in demand. It is very important to understand the logic of change, including the problems of creating artificial intelligence, robotics, etc. [2]

It is necessary to realize that the world has changed from relative stability to the direction of instability, uncertainty, "chaos". This is a rather complicated process. The habit of "going with the flow", maintaining "stability" when "everything is good", leads to stagnation, rapid lagging behind and gradual decay.

The new objective conditions are fundamentally changing the requirements for the labor market - from employees to managers. In the context of digitalization - the "digital economy", new problems arise in the field of economics of law, psychology, health, IT-technology, artificial intelligence, etc. A particular problem in the future is the need to retrain a number of specialists who are no longer needed in the labor market.

A few words should be said about the revolutionary changes in logistics. Blockchain technology in the digital economy makes it possible to reduce and reveal the hidden costs of individual parts of the supply chain, which are traditionally ineffective and the level of trust in which is opaque and very low. The number of intermediaries performing the functions of promoting products on the market will sharply decrease.

We must also take into account the fact that a number of employees performing financial, control operations and risk management will not be in demand.

Blockchain will provide data protection, including financial, which will increase trust between the actors in the supply chain.

Processes for manufacturing, verifying and tracking information in supply chains play a central role. Electronic recording and blockchain technologies allow tracing the movement of each party, increasing the so-called. "Tax on trust", which is associated with the costs and time of employees of various departments (banks, lawyers, transport services). A "digital memory" is created throughout the supply chain. The business model of trust is a new stage of management in logistics, which makes it possible to reduce the cost and facilitate all processes of transaction actions.

The "digital economy" in the field of logistics is of particular importance

due to the fact that more than 50 million people are employed in the field of logistics in the world, in Germany, one of the leading countries in the field of logistics, ≈3 million people, in Russia it is estimated about 2 million people. In connection with the consistent introduction of the "digital economy" in this area, the requirements for the competence of workers involved in the transportation and storage of products, their packaging and other operations are changing. [4]

It follows from the above that the further socio-economic development of the country in the near future will undergo serious changes, including restructuring. The drivers of the country's economic growth, for the implementation of the set chain - the transition to the "digital economy" - is the accelerated development of the "knowledge economy", poverty reduction, implementation of major infrastructure projects, including transport and logistics centers.

Investments in information and communication technologies and in the development of new training programs are especially important. We should briefly dwell on one of these programs - "leader", which is successfully developing in leading universities and business schools in Germany and the United States. The fact is that today's rapidly changing environment brings forward a whole range of new challenges. Goals, strategies, business focus are changing. These processes need to be managed effectively and efficiently. In these conditions, leadership is becoming increasingly important. [5]

As a certain experience of teaching leadership shows [5], it is necessary to develop competence with a focus on the practical implementation of results, on personal development, intercultural communication skills, the possibilities of the digital economy, the socio-economic aspects of the leader's activity, environmental literacy, etc. Naturally, such a program can be implemented in leading colleges and universities. Its implementation is recommended for masters with a clear focus on various industries and activities.

References

1. A.G. Aganbegyan. On the priorities of social policy. - M.: Business Publishing House, 2018.
2. Klaus Schwab, Nicholas Davis Technologies of the fourth industrial revolution. - M.: Eksmo, 2018.

3. Markus H. Dahm, Stefan Thode Hrsg. Strategie und Transformation im digitalen Zeitalter. - Springer Gabler, 2019.
4. Man + machine. New principles of work in the era of artificial intelligence. Paul Doherty, James Wilson. - Mann, Ivanov and Ferber, 2019.
5. 4 new machel for state of theart leadership education with performance as a druing factor for future viability Leadship-Edukation-Personality An Inderdisciplinary Journal 11 July 2020.

QUALITY MANAGEMENT SYSTEM AT AN ENTERPRISE IN THE RADIO ELECTRONIC INDUSTRY

Makolov Vasily Ivanovich

Candidate of Economic Sciences, Associate Professor

Russian State University for the Humanities, Moscow, Russia

Abstract. *In the article there's presented the necessity, external and internal preconditions of building a quality management system (QMS) at the enterprises in the radio electronic industry. There're identified and substantiated industry-specific manufacturing and organizational peculiarities that should be taken into account while designing a QMS.*

Keywords: *Quality management system; radio electronic industry; ISO 9001; building a quality management system.*

Introduction

Under modern economic conditions the effectiveness of planning, realization and progressive advance of the activity of organizations in any branch of economics directly depends on the systematic character, openness and transparency of the applied methods and mechanisms of management. Moreover, the success is mainly achieved by means of introducing and maintaining a QMS by which there's understood a part of an enterprise management system in terms of quality. For Russian enterprises in the radio electronic industry the given task is one of the key ones.

The radio electronic industry is one of the key areas of focus of modern industry, the basis of high-technology products of many branches of industry. In any end-products there are either electronic components or radio electronic assemblies, units, modules, devices, systems.

The main technological tendencies in the market of electronic and radio electronic products can be considered microminiaturization, the increase in productivity, the microcircuit density, expanding the functional capabilities, the integration of different electronic and radio electronic products (ERPs) in one product, and the transition to new advanced materials. Together with these tendencies there can also be noted increasing requirements to the ERP qualitative characteristics, first of all to reliability, technological and operational capabilities, as well as service life and no-failure opera-

tion. The products of the electronic and radio electronic industry refer to high-technology, that's why there're placed high demands on their quality.

Radio electronics is the most rapidly-growing branch of industry in the world in which there're realized a great number of innovative projects; the growth rate of the industry for the past 30 years has been on the average about 8 per cent per year.

For today Russia's radio electronic industry comprises more than 1800 organizations occupied with the development and manufacturing of radio electronic equipment, radio electronic systems and devices of industrial, military, household and any other use.

At present Russia's radio electronic industry provides 275 thousand working places and makes a great contribution into the country's gross domestic product (GDP).

According to the Russian Federation's State program "Development of the Electronic and Radio Electronic Industry, 2013-2025" (approved by the Decree of the Government of the Russian Federation dated December 15, 2012, No.2396-p) the main aim of the state policy in the sphere of the radio electronic industry is improving competitiveness of the radio electronic industry by means of creating the infrastructure for the development of the priority guidelines, integration into the international market and realization of innovative capacity.

In this regard, an important focal point in the state policy in this branch is the distribution in Russia of the world quality and effectiveness standards. In this case, one of the key mechanisms of managing (reducing) the risk of maintaining inefficiency and low entrepreneurial activity of the companies in the branch is introducing modern quality systems. This measure is aimed at increasing the companies' effectiveness as part of the product quality – one of the most important key success factors in the product priorities of the branch development.

Materials and Methods

The analysis of the peculiarities, advantages and problems of building and perfecting a QMS is presented in the following papers: Dahlgaard-Park, & Dahlgaard [5], Oakland [10], Salgado, Silva, Mello, & Silva [12]; Jain, & Ahuja [8]; Alić [1]; Nargesi, Baniani, Galankashi, Ziaei, Zahraee, & Abdolghader [9]; Cagnazzo, Taticchi, & Fuiano [3]; Chatzoglou, Chatzoudes, & Kipraios [4], Gorbashko [7], Belobragin [2], Salimova [11] and others.

The enterprises in the electronic industry all over the world actively implement and certify the QMS. The share of the certificates given to the enterprises in the electronic industry was approximately 9.5 per cent. This

branch is the second on the number of ISO 9001 certificates [6].

There are over one million sites or 880000 companies and organizations in over 170 countries certified to ISO 9000 (ISO, 2019). The leading countries on the number of the given certificates are China, Italy, Germany, Japan and Great Britain (Table 1).

Table 1. The leading countries on the number of the given certificates in ISO 9001

Leading countries	Number of certificates
1. China	295703
2. Italy	87794
3. Japan	47482
4. Spain	34335
5. Germany	31795
6. Great Britain	29562
7. India	26434
8. France	21848
9. Brazil	21095
10. Republic of Korea	16351
Total	612399
Percentage of the total number	69.3 per cent

The first ten countries accounted for 69.3 per cent of all the given certificates. Among the post-Soviet countries the obvious leader is Russia with the number of certificates about 9000, the rest countries have a far smaller number of certificates.

Results

We have found out the prerequisites of building a QMS at the enterprises in radio electronic industry.

The necessity of building a QMS at an enterprise in radio electronic industry arises under the influence of a great number of factors and prerequisites which are commonly divided into two groups: external and internal [7].

The external prerequisites of building a QMS include the following:

1) the availability of the state system of compulsory licensing certain operations, productions, products and services. For today, the presence of a QMS corresponding to the requirements of the industrial standards of management or its individual elements is necessary to get a license for the development, production, testing, storage, sales and recycling of ammunition and explosives;

2) taking part in tenders and other tendering procedures for the prod-

uct supply both on the domestic and foreign market:

a) getting a state order in compliance with the requirements of the Federal Law No. 44 of 05.04.2013 “On contract systems in the sphere of procurement of goods, works and services for provisioning governmental and municipal needs” is in many respects connected with the presence at an enterprise a certified QMS:

b) providing supplies to the enterprises the procurement activities of which are regulated by the requirements of the Federal Law No. 223 of 18.07.2011 “On procurement of goods, works and services by different kinds of legal bodies”. For example, in the procurement documentation of the Public Joint-Stock Company “Gasprom”, the Public Joint-Stock Company “Russian Railways”, the Public Joint-Stock Company “Rostelecom” and so on, a potential supplier having a QMS is welcomed;

c) getting by an enterprise of subcontracts both from foreign customers and Russian export companies often depends on a company having a QMS;

3) the legislation of a series of countries, and since 2000 also Russian, in all disputable situations related to the quality and safety of products and services requires the confirmation of compliance of the product supplied to the market with the current scientific and technical level; in this case the availability of a certified QMS is considered as such a confirmation;

4) an enterprise-supplier having a certified QMS allows it without any extra financial, time and organizing costs clear a number of the set non-tariff (technical) barriers in trade. This practical activity is captured in the agreements developed at the level of the WTO, the Eurasian Economic Union and the international and regional organizations focusing on the issues of technical regulation in foreign trade;

5) The International Electrotechnical Commission (IEC) recommends implementing a QMS at the enterprises of the electronic industry. The ISO together with the IEC developed a number of standards and specifications containing recommendations and requirements to a QMS of the organizations of this branch and the procedures of the evaluation of a QMS;

6) the QMS certification gives an enterprise a necessary level of trust on the market and enhances its business reputation because a conformity certificate is a generally accepted quality guarantee;

7) the opportunities for insurance, factoring, crediting and some other kinds of the support by the financial institutions of transactions on the product supply to both the foreign and domestic markets require the confirmation of the firm's stability, first of all as related to the risks connected with the quality and safety of products that to a certain extent can be confirmed

by the availability of a certified QMS;

8) the prospects of establishing enterprises with foreign capital also depend on the partner enterprises having a certified QMS. In the prospective investors' opinion, the absence of a QMS questions investments security and the possibility of the expansion into new sales markets.

In their turn, the internal prerequisites of the development and implementation of a QMS at the enterprises in the radio electronic industry may include the following:

1) establishing a modern system of management as in the ISO standards of 9000 series there's accumulated the best for the moment management practice based on the Deming cycle of continuous improvements (PDCA), TQM principles and providing the basis for creating the integrated management systems;

2) the availability of a QMS upgrades the quality of an enterprise management on the whole. An optimal combination of managerial functions and the scope of the delegated authority, the responsibility matrix and other tools offered by the ISO standards of 9000 series allow considerable improving the management quality and changing the role of the top management focusing their attention mainly on strategic management;

3) a QMS functioning presupposes the involvement of all the staff in quality assurance at all stages of the product life-cycle – from the demand analysis to the maintenance of the finished products that considerably increases responsibility for the labour quality;

4) a QMS allows considerable reducing rework costs and respectively reducing product costs. Being consumer- and other stakeholders-oriented, a QMS allows anticipating consumers' claims and complaints due to forming a precise mechanism of preventive and corrective measures in the sphere of the quality of the output products and provided services.

5) the QMS availability at an enterprise encourages the growth of its assets: a) intangible assets including good will may increase due to the value enhancement of the trademark of the producer consistently turning out high quality products; b) financial assets may increase due to the income capitalization resulted from the increase in working capital (rise in the prices of high quality products, capturing new sales markets and so on).

No matter which of the given above prerequisites will the key one when making a strategic decision on the development and implementation in a QMS, its basis must become the leadership approach of a company's management team and careful scheduling of all the project's measures on building a QMS.

DISCUSSION AND CONCLUSIONS

A QMS development is rather a labour-taking and long process. According to the requirements of the international standards ISO 9001, establishing a QMS requires an organization's strategic decision the making of which can be influenced by a company's internal and external environment, risks related to this environment, changing business needs, the status of the output products, employed operations, an organization's size, structure as well as particular goals and reasons for building a QMS. Success is achieved due to the observance of the key TQM principles: a) consumer orientation; b) leadership; c) the workers' cooperation; d) the process approach; e) improvement; f) evidence based decision-making; g) mutually beneficial relations with partners or relationships management.

The process of building a QMS at the enterprises of the radio electronic industry presupposes implementing a number of measures and works that can be conventionally broken into the following stages: set-up, principal, final, improvement. This variant of structuring a project corresponds to the Deming cycle of continuous improvements (PDCA) (Fig.1).

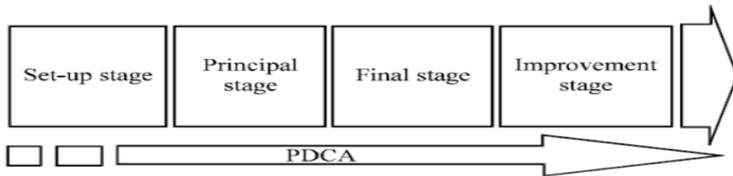


Figure 1. The project's structure on building a QMS of a corporation

At the first stage of the project an enterprise determines the demands and expectations of consumers, the owner and other stakeholders. At the second stage there're developed the strategies and policy in the sphere of quality management. Then there're determined necessary for the strategy implementation business processes as well as the methods and tools of the evaluation of their effectiveness and efficiency. Based on the results of monitoring and measuring the functioning of separate elements and a QMS of an enterprise on the whole there're developed and implemented the measures on the optimization of the organizational structure, business processes, their document support and resources' provision.

In the process of the development and implementation of a QMS it's necessary to take into account the peculiarities of a branch of industry.

The peculiarities of building a QMS in the electronic and radio elec-

tronic industry follow from the specific character of the branch of industry; they can be divided into organizational and technological.

The following technological peculiarities can be referred to the electronic and radio electronic industry:

The electronic and radio electronic branch of industry is the most science-intensive. It brings about a number of requirements:

- a high level of expenses on the Research and Development to the production output;
- a great staff number engaged in science and scientific services in relation to the production personnel;
- the usage of science-intensive products at the initial stage can be inefficient for a long time.

A sophisticated and in some cases unique technology to be developed partly guarantees that the competitors won't be able to copy easily a product and that a great number of the competitors won't enter the market in the nearest time. But on the other hand, if the rework of an article requires some time, it'll considerably increase costs while generating any profit will be delayed.

Scientific-technological progress leads to the quick moral ageing of production. Every year there are developed about 20 per cent new products that requires a quick rearrangement of production and the implementation of a new nomenclature in a relatively short time and with minimum expenses.

In this regard, the increase in the stakeholders' requirements to the product quality as well as the increased competition and scientific-technological progress require building such a QMS that responds to the changing external conditions as quickly as possible and allows ensuring a high level of customer satisfaction.

The following peculiarities can be referred to the organizational ones: The branch is noted for a wide range of nomenclature including the products of the space industry; those designed for the military application; those for industrial and household use.

One enterprise can produce up to two thousand product names that requires a clear organization of the major and auxiliary processes with the focus on the unproductive expenditures optimization.

The branch embraces different types of production; the articles of the electronic and radio electronic industry can be both made in a single copy and mass-produced. The single-item production narrows down the potentialities of using standard constructions and technological decisions. At the production of unique articles there arises a need to use a large number

of the original details, that's why technological processes are developed broadly. The same producing department has to be specialized in executing different manufacturing operations.

The greatest competitive power in the electronic and radio electronic industry is revealed by large enterprises. Almost half of the enterprises in the branch have the number of employees more than 1000 people. On the whole, the share of large and medium-sized (more than 200 employees) enterprises in the electronic and radio electronic industry exceeds 80 per cent of their total number. It brings about an intensive development of vertically integrated systems. In Russia there're built up enterprises according to the vertical type of integration (according to the cycle: research – development – production). At present there work five large integrated structures (OJSC "Air and Space Defense Concern "Almaz-Antey", JSC "Radio Engineering Concern "Vega", JSC "Concern "Sozvezdie", OJSC "Concern "Avtomatika", JSC "Concern "Control Systems" and three large holding companies within the state corporation "Rostec": JSC "Ruselectronics", JSC "Concern "Radio-electronic Technologies" and JSC "United Instrument Manufacturing Corporation".

The corporate structure brings about taking into account its peculiarities while developing a QMS: the presence of a corporate structure and independent business units, multilevel internal corporate communications, a complex system of centralization and decentralization of management functions, a great number and variety of business processes, regional and product diversification and others.

On the whole, a QMS as one of the most widely-spread management tools allows regulating the organizational structure, management mechanisms, optimizing main and secondary processes at the enterprises in radio engineering industry on the whole with a focus on meeting the expectations of the parties concerned that provides in the long run the increase in the competitive capacity of an organization.

References

1. Alič, M. (2014). Impact of ISO 9001 certification cancellation on business performance: a case study in Slovenian organizations. *Total Quality Management and Business Excellence*. Volume 25, Issue 7-8, 790-811.
2. Belobragin V. Ya. Quality. Introduction into the science of quality management (468). M.: RIA «Standards and Quality», 2013.

3. Cagnazzo, L., Taticchi, P., &Fuiano, F. (2010). Benefits, barriers and pitfalls coming from the ISO 9000 implementation: The impact on business performances. *WSEAS Transactions on Business and Economics*. Volume 7, Issue 4, 311-321.
4. Chatzoglou, P., Chatzoudes,, D.&Kipraios, N. (2015). The impact of ISO 9000 certification on firms' financial performance. *International Journal of Operations and Production Management*. Volume 35, Issue 1, 145-174.
5. Dahlgaard-Park, S.M., & Dahlgaard, J.J. (2010). Organizational learnability and innovability. *International Journal of Quality and Service Sciences*, 2(2), 153-174.
6. The ISO Survey of Management System Standard Certifications – 2019 – Explanatory Note
7. ISO Survey // <http://www.iso.org/iso/home/standards/certification/iso-survey.htm?certificate=ISO%209001&countrycode=AF>
8. Gorbashko, E.A. *Quality management: manual for higher educational institutions* (384). St. Petersburg: Piter, 2008.
9. Jain, S.K., &Ahuja, I.S. (2012). ISO 9000 Quality Management System: Literature review and directions. *International Journal of Technology, Policy and Management*, Volume 12, Issue 4, 312-343
10. Nargesi, Z.R., Baniani, A.M., Galankashi, M.R., Ziaei, F., Zahraee, S.M., &Abdolghader, Y. (2013). Organization behavior and development-related issues in effective implementation of ISO 9001. *Jurnal Teknologi (Sciences and Engineering)*. Volume 64, Issue 2, 151-156
11. Oakland, J. (2011). Leadership and policy deployment: The backbone of TQM Total Quality Management & Business Excellence, Volume 22. Number 5-6, 517-534.
12. Salimova, T.A., Makolov, V.I. Unused potential of quality management systems of the Russian companies: An empirical study // *European Research Studies Journal*. Volume 19, Issue Specials-sue3, 2016, 150-166
13. Salgado, E.G., da Silva, C.E.S., Mello, C.H.P., &da Silva, E.R.S. (2014). Difficulties encountered in ISO 9001:2008 implementation projects in incubated technology-based companies. *International Journal for Quality Research*. Volume 8, Issue 3, 357-370.

DOI 10.34660/INF.2020.58.47.003

MANAGEMENT OF ECONOMIC AND ENVIRONMENTAL SECURITY IN THE CONTEXT LOGISTICS INTEGRATION

Muratova Shohista Nimatullayevna

PhD in Economics, Associate Professor

Customs Institute of the State customs Committee of the Republic of Uzbekistan

Abstract. *The article is devoted to the study and assessment of the current state of logistic integration in the context of the globalization of the economy. A comparative analysis of the theoretical and practical approaches to logistics and integration processes is carried out and it is substantiated that it is necessary to consider the modern integration stage in the form of an innovative paradigm.*

Keywords: *Economic integration, free movement of goods, instruments of trade regulation, World Trade Organization, logistics, integrated logistics, integration processes.*

Foreign economic activities of any country, on the one hand, form an important part of the national economic system and, on the other hand, are part of the global system of economic relations. Based on this, it should be noted that foreign trade requires both national and international regulation. In turn, the international division of labor and mutually beneficial exchange are the reasons for the existence of the modern world market. With the development of foreign trade relations between the countries participating in the world market, economic integration is emerging.

Today, the foreign economic policy of the Republic of Uzbekistan is aimed at mutually beneficial integration into the world trade system. At the same time, one of the central directions of the national foreign economic policy has recently become preparation for joining World trade organization (WTO), which regulates more than 90% of world trade today.

Over the past years, a whole package of legislative acts, presidential decrees and government decisions have been adopted that laid the legal foundations for expanding foreign relations, liberalizing all foreign economic activities, and stimulating the development of the Republic's export potential. These are, first of all, the Laws of the Republic of Uzbekistan and decrees of the President of Uzbekistan "On foreign economic activity", "On

measures to stimulate foreign economic activity, attract and protect foreign investment in the Republic", "On the formation of the National Bank for foreign economic activity", etc.

The accession of the Republic of Uzbekistan to WTO will contribute to a significant increase in transportation and increase in commodity flows, which will be due to a reduction in duties, a reduction in the cost of transport services, as well as many other factors.

Many foreign and domestic publications are devoted to the study of integration issues. This is due to the fact that the current period of economic development of the countries participating in world trade is characterized by an increase in the number of industrial, production and trade organizations. Therefore, the concepts of "logistics" and "integration" in the works of foreign researchers are often found in the form of the phrase "integrated logistics" [1, 2, 3, 4, 5]. In these works, these concepts are interpreted in different meanings. As a result, scientific and methodological approaches to the study, research and formation of integrated processes are different.

The study of the interpretation of the concepts "integration", "integration processes", "logistics integration" allowed us to group the meanings of these terms.

In foreign practice, the German scientists H. Kelsen, D. Schinkdler, and R. Schmed developed the theoretical foundations of integration [6]. Methodological foundations of integration processes are put forward by such scientists as A. Marshall, L. Davis, J. Keynes, V. Leontiev, E. Newman, B. Milner, and others.

In the works of K. J. Arrow, integration is seen as the result of a desire to avoid unnecessary risks in the supply of necessary resources. R. Bleyer and D. Kazerman understand integration as a way to significantly save on scale. R. Buzzel, K. Clark, and F. C. Evans state in their works that integration processes also allow us to save costs, diversify, and combine resources [7].

V. Galperin's work [7] provides an interpretation of integration processes in a highly competitive market that allow enterprises to expand and strengthen their power, as well as reduce competition.

After studying and analyzing the opinions of scientists, the author offers a clear interpretation of the concept of "logistics integration": logistics integration is an effective and mutually beneficial process of world trade, where logistics methods are a reliable tool for reducing risks and improving the competitiveness of enterprises.

It should be noted that economic integration – (integration, from latin "integration"-restoration) is the interaction of national economies of coun-

tries of the world, leading to their gradual economic merger. Integration-covering the economy, politics, and social sphere of our life, which is particularly evident in the current period in the economy, is a complex and multi-level process. Integration takes place at different levels (global, regional, and state). A striking example is the European Union, which has been undergoing regional integration processes over the past decades in Europe [8].

The United States, South Korea, Australia, the United Kingdom and other world trade leaders are implementing the principles of free trade with a focus on the demand of the world market. The conclusion of free trade agreements implies the involvement of as many countries as possible. As a result, the sales market increases. Such agreements are an indicator of activation of integration processes [9].

In a global sense, economic integration occurs at the level of national economies. At the same time, economic integration is also observed between manufacturing enterprises, trading firms, and corporations. Sharing resources, pooling capital, creating favorable conditions for economic activity, removing mutual barriers, and expanding production and technological ties leads to economic integration.

From a political point of view, integration is the process and result of interconnection, interaction, convergence and integration into a single whole of any parts, elements-countries, their economies, social and political structures, cultures, social and political groups, ethnic groups, parties, movements, organizations, etc. Sociologists understand integration as a process that results in achieving unity and integrity, consistency within a system based on the interdependence of individual specialized elements [10].

Today, in ensuring economic security, modern logistics integration interacts with the innovation component. The innovative component requires the introduction of integrated logistics and supply chain management as strategic elements in the competitive advantages of enterprises, and with the expansion of technical and technological capabilities of information and computer systems that have changed the idea of planning and controlling complex business processes [11].

The innovation component includes the following stages of development:

- formation of a single information space;
- implementation of integration of logistics business processes in supply chains;
- inter-organizational logistics integration;

- strategic planning and controlling;
- integrated inventory planning and management in the supply chain.

It is known that the market for trade in consumer goods is one of the most competitive, and therefore there is a need to use innovative methods, methods and tools for organizing the movement of goods. In the system of commodity supply of raw materials and products in the field of mass nutrition, there is a need to supply not only high-quality raw materials in certain quantities and the necessary time, but also to choose suppliers who are ready to work in such conditions. The constant change in consumer preferences, the need to supply perishable products requires the introduction of logistics approaches in the supply system. The development of new types of services and the expansion of the network of specialized catering enterprises, including fast food companies, improving the quality of service, and striving to better meet the needs of consumers lead to integration.

Due to the high dynamics of the markets for trade in consumer goods and mass food, rapid changes in needs, increasing requirements for quality and service time, information exchange throughout the logistics chain is becoming particularly relevant.

Any national economy in the period of globalization and integration of national economies cannot function as a closed, self-sufficient system. As a result of foreign economic interaction of States, a world market is emerging, where logistics integration takes place, which ensures the integration of consumer trade market entities in order to optimize a number of similar logistics functions when they are performed together, with the concentration of all types of resources, with the possibility of forming an integrated financial flow to solve strategic tasks in the long term. All this, in the end, will contribute to improving the efficiency of enterprises that are part of the logistics systems of trade services.

Logistics integration allows you to optimize the relationship of business entities, which increases the efficiency of each individual trading enterprise and the integrated system as a whole.

Summarizing the above, it can be stated that logistics integration contributes to the introduction of modern trading technologies, building better logistics systems, reduces the overall level of logistics costs and contributes to the development and improvement of trade efficiency.

References

1. Bowersox D.J. Logistics: integrated supply chain: translated from English. / D.J.Bowersox, D.J. Kloss. - M.: Olymp-Business, 2006. – 640 p.
2. Bulyko A. Big dictionary of foreign words. / A. Bulyko. - M.: MARTIN, 2010. - 704 p.
3. Siegel Joel J. Dictionary of accounting terms / Joel J. Siegel, J.K. Shim. - M.: Infra-M, 2001. - 408 p.
4. Stock J. R. Strategic logistics management: translated from English / J.R.Stock, D.Lambert. - M.: INFRA-M, 2005. - 797 p.
5. Evans Frank Ch. Evaluation of companies in mergers and acquisitions: Creating value in private companies / Evans Frank C., Bishop David M. - M.: Alpina publisher, 2004. - 332 p.
6. Kelsen G. General doctrine of the state. - M., 1928.
7. Galperin V. Theory of the firm / V.Galperin and others. - M.: Economic school, 1995. - 534 p.
8. Political dictionary [Electronic resource] // <http://vslovare.ru/slovo/politicheskijislovar/integratzija> (accessed 12.11.2020).
9. Voronkov L.S. On the diversity of integration processes in Europe / L.S.Voronkov // Bulletin of MGIMO University. – 2013. – №4 (31). – P. 98-105.
10. Sociological encyclopedia of English-Russian dictionary. - Moscow: RUSSO, 2002. - 524 p.
11. Models and methods of logistics theory: textbook / edited By V.S. Lukinsky. - 2nd ed. - St. Petersburg: Peter, 2008. - 448 p.

ON THE METHODOLOGY OF USING CORRUPTION INDICATORS TO ASSESS THE LEVEL OF CORRUPTION BY THE PROSECUTOR'S OFFICE

Zhirnova Inna Olegovna

Research Officer

Research Institute of the University of the Prosecutor's Office of the Russian Federation

Abstract. *The article examines direct and indirect methods of measuring indicators of the level of corruption in society, their strengths and weaknesses. It is concluded that individual direct or indirect indicators for assessing the level of such a complex and multifaceted social phenomenon as corruption cannot give the desired effect. There is no universal method or indicator suitable for assessing corruption in all its manifestations. Only the use of indicators of corruption in a complex (based on opinion polls, data from the Federal Tax Service, Rosfinmonitoring) and individual narrowly targeted indicators (for example, for the public procurement system), as well as the use of expert systems and artificial intelligence to assess corruption risks, will raise the fight against corruption to a new, more quality level. digitalization of the activities of the prosecutor's office to prevent and identify the facts of corruption*

Keywords: *Corruption, indicator, Digitalization.*

Over the past decades, despite the measures taken by the President and the Government of Russia, it has not been possible to get rid of such a social phenomenon as corruption, which has penetrated into the highest bodies of state power, local self-government bodies, and law enforcement agencies.

One of the main activities of the prosecutor's office is the coordination of anti-corruption activities of executive authorities. The importance of combating corruption is determined, first of all, by the damage it causes to our state, hindering the implementation of the outlined development plans in all spheres of public life.

According to the Prosecutor General's Office, the damage caused by

corruption-related crimes amounted to about 55 billion rubles in 2019, and a total of 30,991 corruption crimes were registered. According to the Ministry of Internal Affairs, in just 8 months of 2019, the damage from completed corruption-related criminal cases in Russia amounted to about 102 billion rubles. At the same time, the expenditure side of the budget is 18,037 billion rubles, that is, about 0.3-0.57% of the expenditure side of the budget is plundered. And if we take into account, as shown by the studies conducted at the University of the Prosecutor's Office of the Russian Federation, corruption crimes are characterized by a high degree of latency and are recorded according to various estimates from a fraction of a percent to 3-5% of actually committed corruption crimes, then the damage from corruption crimes amounts to 5.5 trillion rubles. Thus, it turns out that up to 30% of the budget is distributed according to corruption schemes.

Corruption in our country is characterized by the fact that it is systemic and has penetrated all spheres of public life. Teachers and doctors, and ministers and governors can be caught on bribes.

Corruption is especially dangerous among state and municipal employees, the leadership of law enforcement agencies. Subjects of corruption crimes, as a rule, occupy a high position, are positioned by the media as the elite of society. The unlawful corruption acts of this elite to convert their powers into personal financial and other material benefits undermine confidence in the government as a whole, lead to violation of the rights and freedoms of citizens, and pose a threat to national security.

Particularly noteworthy is the fact that corruption in the regions is of a group, clan nature. The materials published by law enforcement agencies show that the teams of corrupt officials have a hierarchical structure, basically repeating the structure of the corresponding authority, as, for example, in the Sakhalin Oblast led by the governor or Makhachkala led by the mayor. Systemic corruption in the regions, as well as in the center, is systemic in nature and repeats the vertical of power. Such a criminal community of corrupt officials includes representatives of the state, municipal administration, legislative authorities, businessmen at the regional and federal levels of the construction, agricultural and transport complex and, unfortunately, law enforcement officials, including the management. As a rule, individual corruption activity is impossible in such conditions. Activities when an individual civil servant tries to implement corruption mechanisms are immediately suppressed by local law enforcement agencies according to the information of the criminal community. And all this is presented in the media as an irreconcilable fight against corruption.

Unfortunately, the corruption mechanisms that have formed have pen-

etrated into all spheres of society and acquired an institutional character, which has turned into an independently functioning social institution interconnected with other social institutions. There are certain unspoken rules of corruption, there is an unspoken price list of corruption services.

It is clear that in such conditions, one should not particularly trust the official statistics on solved corruption crimes. Surely, the statistics of crimes, including corruption, in the Sakhalin Oblast during the time of Governor Khoroshavin's rule did not differ from the statistics of similar crimes in neighboring regions.

In connection with the above, it is relevant to develop methods and techniques for determining and measuring the level of corruption in the regions in order to identify the constituent entities of the Russian Federation that are unfavorable from the point of view of the presence in them of such systemic corruption covering all spheres of activity.

There are direct and indirect methods of changing corruption. Direct methods are based on official statistics available to law enforcement agencies. The difficulty of using direct methods lies in the fact that, based on the number of open or brought to court corruption cases, even having statistics for several previous years, it is difficult to draw any conclusions about the state of corruption in the region or subject of the Russian Federation. A small number of such criminal cases may indicate both a low level of corruption and the fact that law enforcement agencies did not work enough in this area. The damage even from hundreds of cases of "everyday" corruption will be lower than the damage, material and image, caused by one minister, federal or regional.

Indirect methods do not directly measure corruption, but they can be used to identify possible points of localization of corrupt practices and the risks of corruption.

Indirect methods include methods based on sociological research, surveys of experts and entrepreneurs, unfortunately, the practical application of such estimates of the level of corruption is limited. The disadvantage of such methods of measuring corruption is that it is practically impossible to judge the dynamics of changes in the level of corruption by them, and the very assessment of the level of corruption is subjective and, often, politicized.

The mass media also contribute to the opinion of experts and respondents of sociological research. The dissemination of information, often inaccurate, about officials arrested for corruption crimes leads to the formation of public opinion about the total spread of corruption in society, which undoubtedly affects the results of sociological polls.

An example of an indirect method for measuring the level of corruption based on sociological research is the "Methodology for conducting sociological research in order to assess the level of corruption in the constituent entities of the Russian Federation", approved by Decree of the Government of the Russian Federation of 05.25.2019 No. 662 within the framework of the "The National Anti-Corruption Plan for 2018 - 2020", adopted by the Decree of the President of the Russian Federation of June 29, 2018 № 378. The methodology defines the purpose of the study - to assess the level, structure and specifics of corruption in the constituent entity of the Russian Federation, as well as the effectiveness of anti-corruption measures taken and set tasks to identify the values of the parameters for assessing corruption, including the level of corruption, in the constituent entity of the Russian Federation, a description of the structure of corruption in the constituent entity of the Russian Federation, as well as the analysis of the causes and conditions of manifestation of corruption and the assessment of the effectiveness of measures taken in the constituent entity of the Russian Federation aimed at combating corruption;

A sociological study according to the adopted method was supposed to be carried out at the end of 2019, while the results are not known, but it is already clear that in order to get an objective picture of the level of corruption in the region, and in the country as a whole, one cannot be limited to conducting sociological surveys. The results of such surveys are highly dependent on the correct selection of respondents. In addition, the people interviewed may be afraid or even refuse to answer questions directly related to corruption. Corruption assessment methods based on opinion polls appear to work well for assessing "everyday" corruption, but are poorly suited for assessing "business" corruption, at the level of municipal and civil servants.

There are many studies in the scientific literature devoted to identifying the dependence of the level of corruption on such indicators as the level of competition, the level of administrative barriers to entering the market and doing business, the level of development of the legislative framework, the efficiency of the judicial system, law enforcement agencies. These indicators need to be supplemented with the results of sociological surveys for all the parameters proposed above, which will provide an objective and complete assessment of the corruption processes taking place in the region and in the country.

Thus, in order to assess the level of corruption in the constituent entities of the Russian Federation, it is necessary to develop and include in the Methodology for Conducting Sociological Research a section that makes

it possible to assess doing business in the region: the time required to register a business, the frequency of inspections of all levels by regulatory authorities and other indicators.

Their own specific analytical indicators of the possible presence of corruption are needed in the system of public procurement, state defense orders, where corruption has a direct negative effect on long-term opportunities for economic growth, does not allow the most use of funds allocated for the same national projects, causes the greatest material damage to the country, threatens security of the country. At the same time, the anti-corruption analysis of tendering should be carried out at all stages of the execution of the state order: setting the terms of the tender by the customer, choosing the winner and signing a contract with the winner of the tender. Accordingly, all indicators should also be divided into three groups.

The first group relates to the setting of the starting purchase price. To establish the initial contract price, the customer sends a request to several companies operating in this market, or simply takes prices from the company's website. If the initial contract price is set not for the minimum commercial proposal, then this may already indicate possible corruption. An example of the application of direct methods for assessing possible corruption at this stage can be the overestimation of the initial price of contracts and prices in comparison with prices for similar goods and services on the market.

The second group of indicators shows a possible restriction of competition. If, according to the terms of the tender, a large amount of work must be done in an unrealistically short time, then this may also indicate that the customer has already identified the supplier and agreed with him, and the supplier has already begun to work under the contract before its conclusion. The fact that the tender involves companies affiliated with the officials conducting the tender, or companies that are recently registered and do not have qualified personnel, may also indicate corruption.

The last group of indicators related to the results of the tender. The final price of the contract, which is slightly lower than the originally announced one, may indicate fictitious competition in the course of the tender. Also, corruption can be evidenced by the fact that the same suppliers win tenders many times from the same customers.

Currently, there are more than 27 million records in the unified information system in the field of procurement (<https://zakupki.gov.ru/>) therefore, to analyze corruption risks, it is simply necessary to use an expert system, which, according to specified criteria or rules, could allocate for more close scrutiny of those purchases that raise suspicions of corruption.

In addition, it is necessary to develop other indirect methods for assessing the level of corruption, for example, based on data from the Federal State Statistics Service, Rosfinmonitoring and the Accounts Chamber.

Corruption is inextricably linked with the shadow economy, with the illegal circulation of funds, including the withdrawal of criminally acquired funds abroad. Money for corruption must be taken somewhere, stored somewhere or somehow withdrawn to other countries. All this leaves traces, all monetary transactions can be traced. And most importantly, all this can be done before these funds go abroad almost irrevocably. Closer cooperation with the Federal Service for Financial Monitoring (Rosfinmonitoring) and the Central Bank of Russia on these issues is needed. Moreover, the area of corruption offenses, as stated in the Public Report of Rosfinmonitoring "The National Assessment of the Risks of Money Laundering is an area (zone) of risk, i.e. an area where the manifestation of the processes of money laundering and damage to the financial system and the economy is most likely and requires special attention.

One of the activities of Rosfinmonitoring is to ensure the safety of funds of the budgets of the budgetary system and the stability of the budgetary system by identifying and minimizing the risks of theft or misuse of funds aimed at the implementation of the state defense order, within the framework of treasury support of state contracts, the use of state funds allocated under national programs and large infrastructure projects.

It is necessary for Rosfinmonitoring to develop methods based on the methods for calculating individual indices used to calculate the ranking of countries and apply them to assess the level of corruption for the constituent entities of the Russian Federation.

It is impossible not to mention the role of the media and public organizations (for example, the project "For even purchases" of the All-Russian Popular Front) as indicators of corruption in the region, especially since the monitoring of media reports containing information on corruption offenses is included in the main directions supervision over the implementation of anti-corruption legislation. The role of the media in cooperation with the General Prosecutor's Office of the Russian Federation is also great in the formation of civil society, anti-corruption, legal consciousness and moral and ethical standards of modern Russians, without which, as well as without joint efforts of the entire Russian society, it is impossible to defeat corruption as social phenomenon.

The proposed methods and directions for developing indicators for assessing corruption do not exhaust all possible ways to assess such a social phenomenon as corruption. It is necessary to use other economic and

sociological methods to assess corruption.

Undoubtedly, the use of various methods for assessing corruption is impossible without the introduction and development of automated systems and automated complexes that would make it possible to assess corruption by region and subject. In 2017, the Concept of Digital Transformation of Bodies and Organizations of the Prosecutor's Office of the Russian Federation until 2025, a software package is being created, which is, in fact, an expert system with elements of artificial intelligence, which will allow the Prosecutor's Office to automate work processes to identify inaccurate information in the declarations of expenses and income of civil servants is the main corruption offense of Russian officials. So far, this complex automatically checks the declarations submitted by civil servants at the Rosreestr and traffic police databases and identifies undeclared property and funds. In the future, as part of the creation of conditions for the prompt implementation of supervisory functions in connection with the digitalization of supervised objects, it is necessary to automate the processes of anti-corruption analysis of tenders so that for most tenders the market for similar goods and services is automatically analyzed, the affiliation of the companies participating in the tender and according to the specified criteria the software package issued warnings about possible corruption risks during a specific tender.

Thus, the use of individual direct or indirect indicators to assess the level of such a complex and multifaceted social phenomenon as corruption cannot give the desired effect. Today there is no universal method suitable for assessing corruption in all its manifestations. Only the digitalization of the activities of the prosecutor's office to prevent and identify facts of corruption, the use of corruption indicators in a complex (based on opinion polls, data from the Federal Tax Service, Rosfinmonitoring) and individual narrowly focused indicators (for example, for the public procurement system), as well as the use of expert systems and artificial intelligence will raise the fight against corruption to a new, higher quality level.

DOI 10.34660/INF.2020.92.48.005

IMPLEMENTATION OF THE IDEA OF DIDACTIC SYNTHESIS IN THE PREPARATION OF TEACHERS OF THE SUBJECT AREA «NATURAL SCIENCES»

Dubitskaya Larisa Vladimirovna

Doctor of Pedagogic Sciences, Associate Professor
State Socio-Humanitarian University

Bykova Julia Nikolaevna

Physics Teacher of the Highest Qualification Category
Gymnasium №2 "Quantor", Kolomna, Russia

Zolotova Svetlana Nikolaevna

Senior Lecturer
State Socio-Humanitarian University
Kolomna, Russia

Abstract. *The article reveals the idea of the content of professional pedagogical education in the subject area "Natural Sciences" on the basis of a didactic synthesis of physics and biology. Possible approaches to the formation of a holistic understanding of fundamental natural science knowledge, processes and phenomena of the surrounding world are analyzed.*

Keywords: *didactic synthesis, physics, biology, natural science, integrity, fundamentality, competence.*

One of the tasks of the development of modern higher education is to ensure the quality of education while maintaining its fundamental nature. Fundamental scientific research should become the most important resource and tool for students to master the competencies of searching, analyzing, mastering and updating information [8]. Within the framework of various approaches, researchers put different content in the concept of fundamental education, but they all agree on the need for a holistic presentation of the content of fundamental education based on the reflection in it of the foundations of fundamental sciences. In the model of mutual enrichment of sciences, the integrity of scientific knowledge is ensured by interdisciplinary exchange of information. In such a process, more developed sciences, describing relatively simple objects, can significantly influence

the sciences that investigate phenomena of a more complex nature, so the study of such areas of modern scientific knowledge as: biophysics, nanotechnology, ecology, is possible only on the basis of didactic synthesis, namely, with complex consideration of these issues by several academic subjects.

In pedagogical practice, intra-subject and inter-subject synthesis of knowledge is distinguished. Intra-subject synthesis is carried out in the logic of a holistic representation of systems of scientific knowledge, within the framework of subject knowledge. The synthesis is manifested in the modeling of the educational process through the modular representation of the content of education. Interdisciplinary synthesis is manifested in the integrity of sciences, fundamentalization, permeation of the particular with a more general one. Interdisciplinary synthesis as the growth of integrity develops in two directions: through the comprehensive relationship between subjects and cycles and through the harmonization of the relationship between general scientific and special, fundamental and applied areas of knowledge. The manifestation of intersubject synthesis is the methodological basis for the formation of synthesized subjects, such as biophysics, biochemistry, astrophysics, etc. The synthesized subjects close the scientific directions of subject knowledge, thereby ensuring an increase in the level of integrity of knowledge. The use of synthesized sciences in the educational process is a way of implementing the integration of education.

This idea of using synthesized sciences in the educational process is relevant at the moment for general education institutions, since the principle of the subject organization of the content of education has ceased to be decisive in its formation.

In this regard, within the framework of higher education in preparing future teachers for practical activity, the possibilities of integrating knowledge are far from being exhausted. The implementation of the integrative interaction of the content of physics and biology in a course that adequately reflects modern biophysical knowledge can act as a possible direction for increasing the integrity of the content of education in preparing students for work in classes of a natural science profile.

So, for example, with a didactic synthesis of physics and biology, it is possible to create an integrated course of the student's choice (CSC) "Biophysics". This is due to the fact that in biophysics, despite the fact that the main object of research is a living organism, the universal character of the basic physical laws and the rigor of mathematical approaches in the study of vital processes are fully used [2, P.7].

Let us consider in more detail the content of the CSC "Biophysics",

which contributes to the formation of students' ability to implement pedagogical integration at the level of didactic synthesis, and sets the direction for further increasing the level of integrity of the content of biophysical education.

This CSC has the following content:

1. Elements of biophysics in the study of mechanics.
2. Elements of biophysics in the study of heat and molecular phenomena.
3. Elements of biophysics in the study of electricity.
4. Elements of biophysics in the study of vibrations and sound.
5. Elements of biophysics in the study of optics and atomic structure.

For this course, the textbooks of V.F. Antonova, S.A. Starchenko can be recommended as the main literature for preparing students [2, 10].

In the proposed publications on biophysics, various issues of modeling biophysical processes are discussed, and a detailed analysis of the application of the achievements of biophysics in medicine is given. Much attention is also paid to the molecular mechanisms of coupling of mechanical, electrical and energy processes in cells and tissues, etc.

Also recently, enough books on biophysics have been published that can be used in teaching in addition to the above, these are the textbooks of A.B. Rubin "Biophysics" (in three volumes), V.I. Dubrovsky and V.A. Fedorova "Biomechanics: Textbook for secondary and higher educational institutions on physical culture", and the textbook of A.S. Belanovsky "Fundamentals of biophysics in veterinary medicine." This textbook is supplemented with examples of solving problems that are mainly of applied orientation, as well as interesting information from the field of biological physics and medicine.

Another textbook that could be recommended to students, but only as additional literature, is "Biophysics" by Yu. Ackerman [1], since taking into account the year of publication it is now quite difficult to find it. However, in terms of content, it is still interesting and relevant.

Among foreign authors, one can single out the textbook of J.B. Marion "General Physics with Biological Examples" [8]. In addition to biophysical issues, this publication examines material related to the physics of the Earth, atmospheric phenomena, and also establishes the influence of meteorological conditions on the state of the human body.

Among the modern foreign editions, one can mention the books by M. Jerman "Quantitative biology in problems and examples" [4] and K. Smith "Biology of sensory systems" [9]. The latest edition is devoted to the structure and functioning of the sense organs of humans and animals. In

addition to neurobiological aspects, it examines evolutionary, molecular, histological, anatomical, as well as philosophical aspects. The deep unity of the animal world is shown. This manual is interesting because the study of the sensory systems of animals will allow you to free yourself from anthropocentrism and "see" the world around you with other senses. Also, when developing the variable part of the content of the curriculum for bachelors, it is necessary to take into account "the activity-based nature of the standard, which is implemented both in the mandatory minimum and in the requirements for the level of training of graduates." Therefore, taking into account the above requirements in the variable part of the curriculum, it is proposed to include a laboratory practice of integrative content [5].

This integrative content workshop [6] includes 21 laboratory work, and is compiled taking into account the disciplines that students studied in the basic part of the curriculum.

As an example, consider the presentation of the content of one of the works proposed in the workshop: "Measuring the viscosity of a liquid by the Stokes method."

The concept of non-Newtonian and Newtonian fluids is introduced. Non-Newtonian fluids include fluids consisting of complex and large molecules, such as polymer solutions. Blood is also a non-Newtonian liquid, since it contains proteins and blood cells, which are structured formations.

The viscosity of human blood usually ranges from 4 to 5 mPa*s, and in pathology it can vary from 1.7 to 22.9 mPa*s. Blood viscosity is of diagnostic value. In some infectious diseases, the viscosity of the blood increases, and in tuberculosis, for example, it decreases.

A change in blood viscosity is one of the reasons for a change in the erythrocyte sedimentation rate (ESR).

Then the dependence of the viscosity of the liquid on temperature and the Stokes law, according to which the motion of a ball in a viscous liquid is described, is considered.

In the course of the work, students are convinced that the Stokes method is quite simple and does not require special complex equipment, however, the application of the method in medical and biological research is limited, since it requires large amounts of the studied liquid. However, it is used in industry for laboratory determination of the viscosity of engine oil. It is known to perform several important tasks to ensure engine performance. In accordance with GOST 33-2000 (Petroleum products, transparent and opaque liquids), when examining goods, in particular machine oil, the determination of the kinematic viscosity and the calculation of the dynamic viscosity are carried out with a viscometer. Further, the content of

the work itself, which is traditional for a workshop on a general course in physics, is considered.

Consequently, it is necessary to start teaching students how to direct the work of schoolchildren during research at the university. Below are examples of some of the studies we use in preparing students for the upcoming teaching practice in the course of the elective course "Modern technologies of teaching physics." Among them, such as the study of the electrical conductivity of water, soil acidity, sound phenomena, the dependence of illumination on external factors, measurement of the Earth's magnetic field, monitoring of the state of the environment, etc.

Let's look at examples of the simplest research using the LabQuest computer interface and the LabQuest App software.

Study № 3. Study of the electrical properties of various objects.

Purpose of the study: using a voltage sensor to study the electrical characteristics of various objects.

Research equipment: LabQuest measuring and processing device, voltage sensor, lemon, apple, potato, copper and aluminum plates, steel and galvanized nails, interconnect cable, laptop, workbook.

Working process

Offer your students:

1. Connect the voltage probe to the LabQuest measuring and processing device.
2. Switch on the data logger.
3. Make 2 cuts in the lemon.
4. Take an iron nail and a copper plate, fix them in a lemon. Connect with clamps to the voltage sensor and record the readings.
5. Replace the iron nail with a galvanized one, fixing it in lemon, connect it to the voltage sensor and record the readings again. Compare the results obtained with the previous ones.
6. Repeat steps 4-5 for other objects.
9. Make a conclusion about the electrical properties of various objects.

Thus, the implementation of the didactic synthesis of physics and biology in the educational process in the preparation of future teachers increases the integrity of the content of the teacher's education in the subject area "Natural Science", fundamentalizes it, which has a positive effect on the level and quality of his professional training.

References

1. Ackerman, Y. Biophysics / Y. Ackerman. – M.: Mir, 1964. – 684 P.
2. Antonov, V.F., Chernysh, A.M., Pasechnik, V.I., Voznesensky S.A., Kozlova E.K. Biophysics. - M.: Vlados, 2000.
3. Vechkanova, E.A. Design-modular system of teaching physics in basic school as a means of development of students: author. dis. ... cand. ped. sciences: 13.00.02 / Vechkanova Elena Anatolyevna. – M., 2009. – 22 P.
4. Jermain, M. Quantitative biology in problems and examples. - M.: University book, 2012. – 136 P.
5. Dubitskaya, LV Methodological system of teacher training for the implementation of pedagogical integration in the natural science education of secondary school students: dissertation for the degree of Doctor of Pedagogical Sciences: 13.00.02/ Dubitskaya Larisa Vladimirovna. – M.,2016. <http://mpgu.su/wp-content/uploads/2016/06/dissertatsiya-30.05.16-Dubitskaya-Larisa-Vladimirovna.pdf#7>
6. Dubitskaya, L.V. Laboratory workshop: a guide to the discipline of integrative content / L.V. Dubitskaya. – Kolomna: MGOSGI, 2015. – 151 P.
7. Concept for the development of education in the RF until 2020.
8. Marion, J.B. General physics with biological examples / J.B. Marion. – M.: Graduate School, 1986. – 623 P.
9. Smith, K.: Biology of sensory systems.- M.: Binom. Knowledge laboratory, 2020.
10. Starchenko, SA Biophysics: Textbook for 10th grade, schools and lyceums with in-depth study of natural sciences. - Chelyabinsk: "Torch" Publishing House, 1997. - 132 P.
11. Starchenko, S.A. Methodical bases for the implementation of didactic synthesis of the content of natural science education / S. A. Starchenko, N.R. Shtalev. - Chelyabinsk: Publishing house of CSPU, 2005. – 30 P.
12. Federal State Educational Standard of Secondary General Education, clause 18.3.1 (approved by the Order of the Ministry of Education and Science of the Russian Federation of 05.17.2012, № 413).

DISTANCE LEARNING, A STEP FORWARD OR BACKWARD

Shipovskaya Lyudmila Pavlovna

Doctor of Philosophical Sciences, Full Professor

Andryukhov Nikita Mikhailovich

Postgraduate

Moscow automobile and road construction state technical university

Moscow, Russia

Abstract. *The education system is going through a serious evolutionary period, the transition to a distance learning program expands the opportunities for education and simplifies the life of students, but at the same time, the new type of teaching requires the principles of learning and the foundations of personality formation. The forced necessity of distance learning is caused by the epidemiological situation in Russia and in the world. The need to learn through a computer leads to the stress state of students and teachers, which greatly reduces the quality of education. The lack of discipline at home greatly reduces the concentration of students on the subject at hand.*

Introduction

The existing education system has been transformed and regulated for centuries to provide a better, more effective way of transmitting and disseminating information from teachers to students. Nowadays, the informatization and computerization of all spheres of human activity have not left the educational system without attention.

The humanization of education, caused by changes in the cultural and economic development of society as a whole, requires a paradigm shift. Such categories as the strategy of the organization of educational processes and direct educational processes already set a new scale of studying in a pedagogical reality, there are new units of the analysis which cover integrity of a reality, conditions (external and internal) of development of the person in the course of learning. The state of our society has long led to the introduction of a parallel educational paradigm based on dialogue, i.e. equality of partners.

Today, this type of education cannot claim to be global as the need

for it is often overrated by the feeling of its importance. The process of self-education has always been the main process of obtaining university knowledge. In the educational process a student sets goals, learns the methods, content of education, and assesses the results obtained. At each of these steps they may encounter problems that are difficult to solve without assistance. It is no secret that the teaching profession is of great importance to society. But, unfortunately, today it has lost its prestige. Education has moved to the service sector, and the attitude towards teachers has changed in accordance.

Higher education should give a person the opportunity to think, learn new things, set priorities. One of the tasks of higher education is to ensure the development of softskills or simple human qualities: leadership, responsibility and performance, the ability to communicate with people, work in a team, interact with teachers - all this is very important. Nowadays, in the higher education system, not only do they forget about it, but they do not even make the necessary emphasis on such skills. And this is probably not quite right.

How the principle of education formed

In a modern society various types of consciousness develop, these processes are caused by essential reference points of a spiritual condition of the person. The inner worlds of a personality and its self-consciousness have long attracted scientists' attention. Such a cross-section of the problems in the field of education, which proceeds from the awareness and acceptance as equal tasks of the purpose of life and the purpose of education, shifts the perspective of "scientific" understanding of "education", which necessarily leads to a global change in education and upbringing.

The task of humanitarian education is to teach not someone else's experience, but to develop the need for awareness and personal, which can arise through the dialogue of the subject with existence.

In ancient times, knowledge had only a theoretical characteristic, but with the beginning of the industrial revolution, some scientific knowledge began to be applied in practice and bring profit. When knowledge gained practical application, it became profitable for society to have an educated population. There was a need in training of people, educational institutions began to appear. Scientists became the elite of the society, to which all looked up to. Highly esteemed people trained and inspired scientific principles of knowledge of things. The principle of static education continued to develop through the ages and is applied nowadays.

The last several decades can be characterized as years of formation of new information culture, a steep increase of the role of information technol-

ogies and technological components, including in education. The Russian field of education in many aspects is avant-garde in the application of new technologies, including in the field of informatization, which is supported by major projects implemented in this direction at the federal and regional levels, such as the national project "Education". Special attention is paid to the introduction of modern distance technologies in education.

The importance of having a teacher before students

At present, education, especially in Russia, is more mandatory than desired. The tendency to inspire us with education sometimes has a very negative impact on its quality. In the case of students' weak interest in scientific knowledge, and this arises in most cases due to the presence of more interesting activities, for example, (playing mobile games, watching video blogs, viewing photos). All distractions require great energy from the teacher to attract attention and to captivate the students' interest. Having a teacher in front of your eyes, walking, interacting, and gesticulating can increase the attention and concentration of students sitting in the classroom.

"Educational services" appeared in Russian legislation in 1992. The main initiators of its implementation in our educational system were Western (primarily American) advisers. Even then, a lot of disputes and discussions arose around this issue. Because in the Soviet school, no "educational service" was ever even spoken of. Education has always been considered one of the most important social functions of the state in preparing the younger generation for the tasks of state development and for building a new society. According to Oleg Smolin, Deputy Chairman of the State Duma Committee on Education, such an interpretation humiliates teachers and dilutes all spiritual and moral content of educational relations: "Educational relations in their meaning are not functional, but personal relations. A teacher does not serve anyone; he serves his cause, children, and country as an officer or actor in a theater. Therefore, humiliating a teacher by comparing him to a hairdresser is harmful both for a teacher and for the quality of education.

In today's reality, the expression "educational services" equates teachers with service staff. "We just need to change, and we need to do it now, today and immediately, the public's attitude to the service of the teacher. "Services" should disappear. There can be no services in education," said Education Minister O. Vasilyeva.

Distance learning

Distance education began even before our era, as it does not sound strange, but the first remote devices were books. Books written by the greatest scientists and thinkers can teach the people reading them through

space and time. But nowadays, distance education has acquired the reputation for "stuffing" knowledge into the human brain. After all, for the "extraction" of information from a printed source requires skills and abilities to work with texts. The start of a new distance learning age began in 2003 and continues to develop at an incredible speed [1]. The trend of availability of education around the world sounds like something magical - saving time on traveling to an educational institution, expanding geography - teaching foreign students, the opportunity to have complete freedom of action - all this seems to add huge advantages to distance education.

Today there are many adherents of the once fantastic concept about the similarity of the human body to a computer program. As it turned out, they have much in common, much more than it was possible to imagine in the middle of the last century.

Changes in the field of education cannot but obey objective laws. The third law of dialectics, as it is known, says: development inevitably goes through destruction. Innovations in the educational environment have replaced the foundations that have worked for years and decades. Of course, there are several objective reasons for this.

First, changes and reforms in education were inevitable during the transition from planned to market economy.

Secondly, higher education could not but respond to those socio-cultural changes that were global in nature. This was and will always be the case. It is a pity that some things go back in time.

It is no coincidence that today we hear more and more voices calling for reasonable conservatism. Opinions are expressed about the need to take the higher school out of the state of continuous experimentation. The authorities, working on changing the laws, today make crucial strategic decisions that affect millions of people interested in receiving quality education in the present and future. Do we need to repeat once again that the future well-being of the country depends on the state of education? [3].

The prospective future lies in knowledge and personal orientation of innovative education based on philosophical foundations. Truth has no past, no present, no future; it exists always and everywhere. Developing along the path of evolution, the human being changes and his consciousness grows, but only the essence does not change: "The human being is the cause for what happens to him".

Today, no one can be surprised by distance learning; the majority of educational institutions at various levels in Russia and abroad use remote technologies to varying degrees in the teaching process. Many students today consider this form of education as an alternative to the usual one

not only in the process of obtaining a second degree, but also choose this method for their first higher education. There is no escape from modern trends, and many universities understand this and try to develop in this direction.

No matter how brilliant this or that pedagogical invention is, it, unfortunately, will certainly be deformed and distorted by practice based on the former system of ideas.

The process of developing fundamentally new (innovative) pedagogical forms, devoid of fundamental philosophical justifications cannot be successful (cultural values, fundamental worldview attitudes that meet the requirements that are objectively put forward to the individual in the conditions of modern society).

By the way, it is correct to say "distance learning", not "distance education", as it is only another way of forming the knowledge and skills of a student, and the content of education remains the same.

Feasibility and effectiveness of distance learning

Distance learning, as well as any other form of knowledge acquisition, has many advantages and disadvantages.

Let us give our thoughts on this issue.

So, the advantages:

1) The majority of researchers call the first "pro" of distance learning the opportunity for students to receive on-the-job education [1, 2]. This is, indeed, a very important argument for choosing this form of education, especially for those who have chosen to pursue higher education as an adult;

2) It is not necessary to travel to the institution, at least not frequently. This is especially true for students from the periphery: it reduces financial costs and provides the opportunity to obtain a degree from the capital city or from abroad;

3) Those who are physically unable to attend classrooms because of a disability also have the opportunity to receive an education.

4) Opportunity for students to participate in the organization of their learning: Choose the time and place to work with the material and determine the speed at which they can learn the material that suits their thinking needs;

5) For a university, distance learning can reach more students, i.e., increase the target audience.

The disadvantages:

1) The student does not have the opportunity to consult with the instructor in person;

2) There is no opportunity to study "live" to build relationships in a team

Process Management and Scientific Developments

(with teachers, classmates, university administration), to speak to the audience;

3) Not every profession can be taught remotely (doctor, pilot, builder, veterinarian);

4) Not every student is able to maintain his or her motivation for independent work. In addition, the absence of such an effective motivating factor (the teacher) takes its toll. Those teachers who work with the 1st year in higher education institutions know how important it is for freshmen, especially at the beginning, to check their homework and regularly organize verification and control activities. The percentage of students who do not need such supervision is very low.

5) A student does not have the opportunity to compare intermediate results of his or her studies with other students, and does not have the opportunity to compare "live" results: when working at the blackboard, speaking at conferences, etc.

6) The absence of a person who submits material with an emotional coloring, which affects the degree of his understanding (remember a fragment of the movie "The Long Recess", in which Nestor Petrovich is giving a lecture about the Emperor Nero, who ordered the burning of Rome, which would have inspired him to write poems about the fire - none of the listeners remained indifferent).

7) It is important for the teacher in the classroom to feel the students' understanding of the material (according to their views, the questions asked, the answers to their questions) and to quickly adjust the teaching process: to repeat difficult moments once again, to give additional explanations on some questions, to change the pace of the presentation. In distance learning, this connection is lost;

8) The student has the temptation and opportunity for "off-campus" study and the instructor has no way of controlling such costs of distance learning;

9) For an institution of higher education, the introduction of distance learning is associated with high material costs: technical equipment, software and hardware, training of special personnel, etc.

Problems of distance learning

According to the new Federal State Educational Standards, an information and educational environment should be formed in educational institutions, which, including distance learning, should ensure the interaction of all participants in the educational process: students, their parents (legal guardians), teachers, educational authorities and the public. In 2020, distance learning in all educational institutions of Russia was introduced as

a preventive measure against the spread of viruses. As a precautionary measure, this method of education is excellent, but as a way of evolution in the field of learning it is a dead end.

Trainees who have been trained in the distance learning program treat it as a kind of fun where they should pretend to study the material. The lack of discipline prevents students from concentrating on their studies, as there are many temptations at home.

The modern educational process today is impossible to imagine without using computers, information and communication technologies (ICT), electronic and distance learning. The teacher today, except for the subject, should know bases of management of educational activity in the ICT-saturated environment, to use last achievements of electronic pedagogics. And it is not just a wish anymore, but the necessary professional competences. Thus, in the "Qualification characteristics of educational positions" for all categories of teachers it is written: "Must know ... modern forms and methods of teaching and education; methods and ways of using educational technologies, including distance ones". Distance educational technologies require from a teacher not only a high degree of knowledge of ICT technologies, but also a completely different psychological and pedagogical model of learning, it is: intensive interaction between teacher and students, targeted use of information and communication technologies by students in the educational process, the transition from the philosophy of "give knowledge" to the philosophy of "teach to produce knowledge".

Social communication at both school and university should form in students the personality of the one who distinguishes good from bad.

In an institution the economic status is leveled off; the teacher evaluates knowledge, not status. Distance learning has shown that we are not yet completely ready for this form of learning, so that to study at home or in a dormitory you need technical means such as a computer, internet, web camera, etc.

Having more than one student (and we have more than one student at all times) in the dormitory leads to the need to have several computers and the necessary funds for the number of students, which leads to the use of one technical device for several students. The result of such a problem is not a full mastery of the material. Distance learning requires strict self-discipline, and its result is directly dependent on the independence and consciousness of the student; the need for constant access to sources of information. Good technical equipment is needed, but not everyone who wants to study has a computer and Internet access; as a rule, students feel the lack of practical training; there is no constant control over students,

which for a Russian person is a powerful incentive.

The ultimate goal of education is not only accumulation and transfer of information, but the main thing in education is strengthening of spirituality as the ability to live consciously and morally.

Conclusion

The catalyst for distance learning was the need to preserve the health of students and their loved ones, but with the benefit of social distancing the positive aspects come to an end. Continued funding and development of distance learning after the epidemiological period will lead to the loss of centuries of knowledge and standards of education.

References

1. Likhtina I.S., Pavlova N.A. 2017 Organization and support of training of teachers in the field of remote educational technologies The education and upbringing. 5(15) - p.40-45.
2. Nazarova T.S., Shapovalenko V.S. 2019 "Synergetic syndrome" in pedagogy // Pedagogy. - 9. - p.25-33.
3. Belukhina N. 2009. Distance education - lifelong learning Bulletin of ulyanovsk state technical university. - 4(48). - p.4-7.
4. Rozhkova O.O. 2014. Research and distance learning as a basis for integrating general and additional education for children Computer science and education. - 6 (255). - p.11-13.
5. Smolentsev I. 2011. Distance education and prospects of higher education Modernization of culture: Pedagogical and information technologies in education. - 10. - p.1-9.

DOI 10.34660/INF.2020.56.35.007

NEUROPSYCHOLOGICAL TECHNOLOGY OF PEOPLE AFTER 60 YEARS

Lezina Valeriya Vladimirovna

Doctor of Pedagogical Sciences, Full Professor
Pyatigorsk State University

Malsagova Maryam Khamatkhanovna

Candidate of Pedagogical Sciences, Senior Teacher
Ingush State University

Annotation. *This article attempts to investigate the dynamics of brain activity during natural aging. After 60 years, people experience difficulties in mastering new information, they solve situational problems more slowly, find arguments more difficult, and are more often distracted by accompanying information. However, intelligence is conditioned by employment, type of activity; some of its functions continue to evolve. The authors tried to develop a technology for teaching people after 60 years*

Keywords. *Elderly people, brain activity, intelligence, neuropsychological technology, brain aging, memorization*

Elderly people make a separate contingent of students. The weakening of their intellectual abilities after 60 years is noted by scientists (A. Anastasi [1: 52], M. P. Karpenko, L. M. Kachalova, E. V. Budilova, A. T. Terekhin [2: 292-294], etc.). Attention, productivity of working and long-term memory, and complex logical reasoning are reduced [3: 942]. After the age of 60, people feel difficulties in mastering new information; they solve situational problems more slowly, find arguments more difficult, and are more often distracted by related information. In older age, people find a decrease in activity in the left anterior frontal cortex and mid-temporal zones, changes in local cerebral blood flow in all major areas of the cerebral cortex.

The effects of natural brain aging are divided into groups by neuroscientists. The group of neural effects includes a decrease in its volume, a reduction in dopamine reserves, regression processes in the white matter, and a narrowing of the gray matter layer. The group of deterioration of functional (systemic) mechanisms includes weakened involvement of the medial temporal regions, dedifferentiation of the ventral visual region, and

increased activity of the system for ensuring quiet wakefulness.

Age-related changes lead to changes in the hormonal background: people after 60 years begin to think partly as representatives of the opposite sex. In men, the brain shrinks in size earlier in the aging process. Their nerve tissue is compressed in the temporal and frontal lobes associated with feelings and thinking. In women, tissue shrinks in the hippocampus and parietal lobes, which are responsible for memory and spatial-visual abilities [4: 72]. In 75-84 years, the rate of information assimilation in women is higher than in men, but in 85-94 years, men are ahead of women in this type of mental activity. This is due to a higher IQ in men who live till this age (according to statistics, men die earlier than women) [5: 115-120]).

However, as a result of degenerative brain processes in people over 60 years old, there is a relative preservation of the main neural mechanisms, cognitive functions. Age-related degradation of the brain is compensated by its own natural mechanisms. Modern neuroimaging methods have encouraging evidence that in response to age-related neurobiological changes in the brain substrate, dynamic restructuring and modernization of neural systems is carried out [6: 175].

The theory of adaptive changes in the brain's provision of cognitive activity during aging (The scaffolding theory of aging and cognition/ STAC) states that functional changes in old age are a compensatory adaptation, or adaptation to age-related brain degradation [6: 177]. The process of its functional changes is figuratively a "repair": the elimination of damaged connections, the formation of new ones, and the strengthening of active ones. Compensatory mechanisms of the brain of people over 60 years of age are the growth and development of nerve tissue, additional inclusion of the anterior regions of the cortex, the distribution of information processing in the brain space, and an increase in the degree of bilateralism of system mechanisms.

This phenomenon is explained by the presence of two forms of intelligence identified by R. B. Cattell: "fluid" and "crystallized" [7: 21]. The first one is given to a person at birth, actively develops during the entire period of adulthood and mature life, and weakens after 60. Initially, the mnemonic processes of partial abilities (verbal, spatial, arithmetic, etc.) fail, determined by active perception, the speed of encoding and updating information in short-term memory, and long-term storage of information. The crystallized intelligence acquired throughout life has a persistent tendency to increase up to 80 years, and weakens due to the destruction of mnemonic abilities.

In this regard, after the age of 60, intelligence is determined by employ-

ment, type of activity; some of its functions continue to develop. Stimulating the compensatory mechanisms of the brain in people over 60 years of age contributes to learning something new, intensive activity, physical activity, cognitive training. Training for the elderly should be supportive, i.e. include special methods, forms, technologies, and techniques. The basis of such training is a person-centered approach, which consists in trusting human nature and the ability of its self-development.

Modern gerontology has accumulated a large database of empirical data that is encouraging in its forecasts. P. Reuter-Lorenz and D. Park confirm that the adaptive abilities of the brain are manifested at any age, but the resources of adaptation are limited after 60 years and are less effective than in the early stages of ontogenesis [6: 179].

Obtained by M. Ito [8: 201-209] research results suggest that the skill acquired by a person is the result of removing some synaptic connections and simultaneously increasing the plasticity of others. Age-related, competence-related, and experience-related synapse formation increases without being linearly or logarithmically dependent. For the learning brain of an elderly person, the loss of cells during learning is not a component of forgetting, since it also detects proliferation (cell division) in the hippocampus. Only systematic learning leads to structural changes in the brain [9: 15].

The ability of the hippocampus to use the embryonic stock of stem cells to form new pools of learning neurons and neural networks is of interest. According to experimental studies of E. Drapeau, V. Mayo, S. Aurosseau [10: 22-29] it is clear from the orientation of rats in the Morris water maze that memory dysfunction in old individuals is quantitatively related to the possibility of neurogenesis in the hippocampus. Therefore, neurogenesis is a component of memory and age-related changes in cognitive processes. The experiment demonstrated the intensity of neuron neoplasms during the first period of active training of animals and the second period of error correction. These periods were characterized by the appearance of new neurons in the dentate gyrus [11: 975-977]. Once differentiated into neurons, these cells are viable for no more than a month. During this period, information is transmitted to the new cortex. At the same time, cells that appeared in the early period of training die off in the later periods of training.

The loss of a part of neurons by the brain is a mechanism for correcting the mosaic of neural networks. First of all, neurons that have not established synaptic contacts to solve the learning problem (learning-related synaptic connections) are eliminated. Based on this, at the junction of neurodidactics, neurobiology and physiology, the problem of the property of nerve cells to enter apoptosis (self-destruction) is actualized due to their

non-involvement in the system of working nerve networks. It also follows that learning has a complex effect on neurogenesis, and the latter is a mechanism for influencing behavior and cognitive processes [10]. In addition, neurogenesis is regulated in the structures of the hippocampus.

Taking this into account, the task of retraining persons after 60 years of age, considered by neuroscience as the elimination of established neural networks, can be solved. For the solution of this task, the moment of the degree of this process is essential: deep or fragmentary elimination.

Age-related changes in the brain have different personal severity: both the degree of degenerative and compensatory changes are different. Individual and cross-cultural factors should be taken into account in teaching people over the age of 60. An example of increasing the cognitive dynamics of aging, maintaining learning activity is the Indo-Tibetan model. The models of traditional societies allow maintaining the high status of the elderly person, generalization and acceptance of his cognitive intentions. Such models allow you to safely bypass the allostatic burden leading to premature wear of the body due to positive emotions, association, and creative activity.

Experimental studies of I. V. Tikhomirova, E. V. Chmyhova, N. F. Shlyakhta [12: 88-101] reflected the need to correct the well-established in modern education teaching model of "full assimilation" for people over 60 by B.S. Bloom [13]. We recognize the validity of the authors' rejection of a single average pace of academic work, the need to remove restrictions on the time frame for learning the educational material. The older the age group, the more difficult it is to complete memorization. The volume and rate of memorization for people over 60 years of age should be adjusted. This conclusion is confirmed by the results of research by L. M. Kachalova, S. F. Bogolepova, V. V. Plyplin, E. V. Chikin [14: 112]: they believe that the decrease in the amount of RAM with age, the tendency to reduce the duration of time intervals (subjective time deficit) are indicators of persistent increased brain activation, emotional tension, increased anxiety, and violations of the function of activating brain systems. These dysfunctions lead to a disorder of cognitive activity. The age factor contributes to the manifestation of an imbalance in the activating systems of the brain, determined by individual properties of the nervous system, functional disorders and somatic diseases. Based on this, the training system for people over 60 years of age should take into account this imbalance of non-specific regulation and offer older people a multi-level system of influences for optimal assimilation of educational information.

Such a system of influences has been developed in our neurodidactic

technology of teaching people after 60 years. The parameters of training optimization will be: 1) reliance on "crystallized" intelligence, which retains the previously formed competencies until old age, 2) consideration of compensatory mechanisms (redistribution of cognitive load in different areas of the brain, an increase in the degree of bilateralism of systemic mechanisms, the development and growth of nervous tissue, etc.), 3) the use of persistent a) abilities (linguistic and computational, routine everyday and professional), b) procedural memory [15], 4) taking into account the functional state of the student, achieving a balance of the activating systems of his brain, 5) identifying motivation and subjective experience, using them in teaching, 6) structuring the educational material, using visualization (graphs, diagrams, pictures), logical diagrams, tips from the teacher, 7) avoiding stressful situations by relieving anxiety, instilling success, conveying joy from what was learned, 8) introducing trainings, discussions, brain training, relaxing techniques, physical education minutes into the educational process, 9) removing time restrictions in the implementation control of the formed competencies, 10) development of strategies and tactics of cognitive activity (memory, attention, etc.), 11) impact on the emotional state (suppression of the activity of the tonsil, which is responsible for negative emotions, through moderately hard work), 12) consideration of cross-cultural factors of status and education of older persons. These parameters form the basis of our technology.

These technological parameters do not simplify the neurodidactic process, but are designed for the age-related features of the brain and the advantages of cognitive abilities of people after 60 years of age. As part of the abilities of older people, J. Bruner [16: 114], T. Mix, D. Jistie [17: 355-356], V. N. Druzhinin [18: 45], J. Hopfield [19: 254], A.T. Terekhin, E.V. Budilova, M.P. Karpenko [20: 450-452] distinguish wisdom as a metacognitive factor.

From the point of view of neurobiology, wisdom is a frontostriatal and frontolimbic network with monoaminergic connections. It is provided by a balance between the functioning of phylogenetically old (limbic system) and new (prefrontal cortex) zones [17: 355-356]. According to J. Hopfield [19], M.P. Karpenko, L.M. Kachalova, E.V. Budilova, A.T. Terekhina, the relief of the neural network energy function in people after 60 years of age is smoothed due to the weakening of inter-neural connections [21: 292-294]. The younger age group has an uncoordinated energy function that gets stuck when making important decisions. The cognitive effect of age-related smoothing of the neural network energy function relief is manifested in overcoming network jamming in local suboptimal States. This contributes to a holistic view of the situation, highlighting its significant aspects. The

ability to assess problem situations in General and find strategically correct solutions is traditionally associated with the cognitive ability of the elderly.

To summarize: the dynamics of brain activity in the process of natural aging is a natural mechanism for compensating age-related cognitive deficits. Taking into account the general and individual destructive age processes, as well as the mechanisms and factors of such compensation, opens the way to neurodidactic technologies for teaching people after 60 years of age. This technology was developed in the presented study.

References

1. Anastasi A., Urbina S. Psychological testing. St. Petersburg: Piter, 2003. P. 52
2. Karpenko M. P., Kachalova L. M., Budilova E. V., Terekhin A. T. Cognitive advantages of the third age: a neural network model of brain aging // Pavlov journal of higher nervous activity, 2009. Vol. 59. No. 2. P. 292-294
3. Kramer A. F., Bherer L., Colcombs.J. Influence of the environment on cognitive plasticity and brain plasticity during aging // J. Gerontol. Biol. Sci. Medical Sci. b 2004. Volume 59. No 9. P. 942
4. Carter R. How the brain works. M: CORPUS, 2014. P. 72
5. Psychology of learning, 2017. No. 2. P. 115-120.
6. Reuter-Lorenz P. Adaptive brain: aging and neurocognitive forests // Annu. Psychol., 2009. Volume 60, P. 175
7. Cattell R. B. Theory of fluid and crystallized intelligence: a critical experiment // Journal of educational psychology, 1963. No 54. P. 21.
8. Ito M. Brain and mind: for a better understanding of the dynamic function of the mind and its supporting brain mechanism. Amsterdam-Oxford: Elsevier, 1997. P. 201-209
9. Bruer J. T. Education and the brain // Educational leaders, 1999. In Ol. 56. No. 3. P. 15.
10. Drapeau E., Mayo W., Arousseau C. Brain and Mind // UK Elsevier Science, 1997. P. 22-29.
11. Dobrossy M.D., Drapeau E., Mayo W., Arousseau C. Differential effects of training on neurogenesis: training increases or decreases the number of newborn cells depending on their date of birth // J.Mo 1. Psychiatry. 2003. In Ol. 8. No. 12. P. 975-977

12. Tikhomirova I. V., Chmyhova E. V., Shlyakhta N. F. Study of the model of complete assimilation of educational information // Proceedings of SSU. Psychology and sociology of education, 2001. Issue 25. P. 88-101
13. Bloom B.S. All our children learning: a primer for parents, teachers and other educators. New York, London: McGraw-Hill, 1981
14. Karpenko M. P. Teleobuchenie. M.: SGA, 2008. P. 112.
15. Schaie K.W. The development of fluences on the intelligence of adults: a Seattle longitudinal study. Oxford: Oxford University Press, 2005.
16. Bruner J.C. In search of reason. New York: Harper & Row, 1983. P. 114.
17. Mix T., Jistie D. // Neurobiology. Literature review // Arch Gen Psychiatry, 2009. N. 66. 4. P. 355-356.
18. Druzhinin V. N. Psychology of General abilities, 3rd ed., St. Petersburg: Peter, 2007. P. 45.
19. Hopfield George. Neural networks and physical systems with emergent collective computing abilities // Proc. Acad. Sci. USA, 1982. Vol. 79. No. 8. P. 254.
20. Terekhin A. T., Budilova E. V., Karpenko M. P. Lyapunov Function as a tool for studying cognitive and regulatory processes of the body // Computer research and modeling, 2009. Vol. 1. No. 4. P. 450-452.
21. Karpenko M. P., Kachalova L. M. Budilova E. V., Terekhin A. T. Cognitive advantages of the third age: a neural network model of brain aging // Pavlov Journal of higher nervous activity, 2009, Vol. 59, No. 2, P. 292-294.

THE UNIVERSITY TEACHERS' COMPETENCES IN THE MODERN EDUCATIONAL ENVIRONMENT

Danilova Yulia Sergeevna

Candidate of Pedagogical Sciences, Associate Professor,
Tula State Tolstoy Pedagogical University

Annotation. *The article is devoted to the problem of the professional personality development of a university teacher. The author presents own vision of the most significant competences in the educational environment and reveals 5 groups of a university teacher competences for modern education. They reflect his continuing professional development as a Maitre (master of the art of teaching).*

Keywords: *university teacher, competence, pedagogy, continuous development, education.*

The creation of a common European economic space has led to close interaction between members of professional communities, including university ones, from different countries while working on various joint projects and regulatory documents. One of the tasks of the university policy in modern Russia is focused on the development of problems aimed on the continuous training of a university teacher. It depends not only the quality of education, his competence level, but also the development an educational institution, and, possibly, even the life support of the nation. That is why the priority idea of innovative transformations of the postgraduate education of the university teacher is to increase professionalism based on the transition from the technocratic paradigm to the humanistic one, the development of the university teacher's creative potential, his focus on humanistic pedagogy [4; 5]. Currently, there are a considerable amounts of researches on various aspects of the activities and training of teachers (N.V. Nikandrov, A.A. Orlov, V.A. Slastenin, N.A. Shaidenko). However, according to the modern approach in university management, there is not enough scientific work exploring the problems of human resource management in the context of the development of a higher educational institution. The objectives, content and technologies of advanced training of the teaching staff and the professional personality development of a university

teacher acquire a special meaning and require more detailed study.

The modern paradigm of education proclaims the thesis of the International Commission on Education for the 21st Century at UNESCO that the education of any specialist should turn into a process of continuous development of the human personality [10]. It defines the new tasks for Russian universities to create the conditions for updating the professional and psychological potential of the university teacher's personality and to ensure social protection of a specialist by increasing his competitiveness in the labor market. Thus, as a unifying idea should be the idea of the university teacher personality development by improving not only his qualifications, but also the development of the professional and psychological potential of his personality as the basis for the development of an educational institution. In this context, development is considered as a symbol of movement, productive change; as a general formula, a principle for interpreting what is happening in the educational process; as a general requirement for a person [2; 3].

The tendency to learn lifelong, it is relevant for the profession of teacher. It demands his continuous education due to many factors: the incessant development of the society itself, the constant updating of curricula, the improvement of technical teaching aids and the increased growth rates of scientific information, the emergence of new pedagogical technologies. In this regard, the question becomes relevant: "What is the model of a university teacher in the 21st century, and what are his competences?" [1].

Models of a teacher for a modern university, developed by scientists from various positions, are designed to concretize the objectives of a specialist's professional activity, and to determine the principles and means of their development and improvement. In this aspect, the research of foreign colleagues, focused on creating the most optimal model for the development of a university teacher, presented in the program of the Romance Council for Education and Development, can be interesting and useful for Russian education [9]. The most optimal are models systemic in nature, assimilating the advantages of qualification and competence-based models. They contribute to the most complete reflection of the components of such a complex concept as a model of a specialist, namely a university teacher. In this case, three directions of movement (development) of a specialist in the educational environment are possible: 1) improvement of professional qualifications, professional skills without changing the formal education; 2) progressive movement step-by-step in formal and informal professional education; 3) improvement of professional qualifications associated with a change in the profile of education in accordance with the

needs of the individual, socio-economic conditions in society [4].

The development of the professional and psychological potential of any specialist, including a teacher of higher education, occurs through the formation of his acmeological orientation and professional consciousness, social and professional intelligence, emotional and volitional sphere, a positive attitude to the world and to oneself, independence, autonomy and self-confidence, professionally important qualities and competences. The acmeological approach in the model of a modern university teacher presupposes the holistic, integral and sustainable development of professionally significant personality characteristics and competencies based on his inner qualities, positive self-esteem, self-identification and self-reflection as a subject of the profession.

The level of qualifications of a university teacher in a modern post-industrial society in the light of globalization trends cannot be considered high if it does not solve the problems of effective international professionally significant exchange and cooperation.

For this purpose, scientists of the working groups from European, Canadian and English universities with the assistance of the Romance Council for Education and Development, have identified an approximate list of competences for university teachers, which will allow them to actively carry out their activities in various areas within the framework of the Bologna process.

We note that even before the Bologna Declaration, 43 states signed the Lisbon Convention - the Convention on the Recognition of Qualifications Relating to Higher Education in the European Region Lisbon Convention (Lisbon, 1997; ratified by the Russian Federation in 2000), which recommends the members-countries to recognize academic qualifications and reflecting their documents when it comes to states that have signed the convention. However, the convention is of a framework nature and the above recommendation is not binding. Even a special bilateral agreement concluded between the Russian Federation and France regarding the recognition of the equivalence of the French degree of Doctor of Science (PhD) and the Russian degree of Candidate of Science, due to the lack of a prescribed procedure for equivalence, is, unfortunately, not a direct document and does not eliminate the need for a general procedure for special examination dissertation defended in France by the structures of the Higher Attestation Commission, etc. [3; 8].

The above-mentioned recommendations were put into practice in the project of the Romance Council for Education and Development to create a list of competences for university teachers. This project is intended to in-

involve university teachers from different countries themselves in promoting the Bologna reforms, and the developed key competences should become one of the main tools for creating a European higher education area. We believe that it will be interesting for Russian university teachers to get acquainted with it, taking into account the fact that higher education in Russia is developing in the frame of reference of the European educational environment.

The goal of the project is to create a list of competences and promote professional cooperation and growth of university teachers; development of joint programs of various types, representing the closest form of interaction between universities in the scientific and educational process; establishment of long-term professional contacts, in particular, cooperation in scientific research with foreign colleagues [9; 7].

We believe that today any university teacher needs the following groups of competences in modern educational environment.

1. Competences to design and plan the educational process. This group is focused on diversifying the pedagogical strategies that the university teacher uses in classroom work. In the course of professional activity, he independently determines the objectives of the work, the stages and ways of its implementation, carries out self-control and self-assessment of his actions. The answer to an important question must be found for every university teacher: "I teach, and they, the students – do they learn, do they learn something new and personally and professionally significant for them?"

2. Competences aimed at the innovative and experimental activities. This group leads a university teacher to constant search of new effective technologies in education. In this case, knowledge of the criteria and assessment of pedagogical innovations and their ability to use form the basis for pedagogical creativity of university teachers, development of professional culture - from simple reproduction, the introduction of its own pedagogical activity of known educational community knowledge, technologies, concepts on individual logic level to their heuristic, creative development and implementation. The development of these competences becomes even more relevant as the basis for the creative individuality of a specialist and includes a high level of autonomy, professionalism and competitiveness - everything that corresponds to the social order of society [6].

3. Competences in self-development. In this aspect, one of the main conditions for the professional value and competitiveness of a university teacher in the labor market is participation in international projects, conferences, the ability to present their ideas and developments, the ability to

carry out professionally oriented communication, which is extremely important. A high-class university teacher clearly understands the need for constant self-development and self-education, which is the key to competitiveness, an indicator of personal mastery and maturity. As a strategy for self-development in substantiating and implementing individual activity programs, the authors-developers have identified a personal approach that takes into account that all external pedagogical influences always act indirectly, refracting through the internal conditions of the personality and individuality of the university teacher. This focuses on the formation of a value attitude towards the university teacher as a person, which requires the study of the mechanisms of self-realization, self-development, self-regulation, social self-defense, adaptation of a person to social conditions, his integration into society, with simultaneous autonomy from him. It provides for the study of the nomenclature of the goals of personal self-development, the identification of the specific content of education, on the basis of which personal qualities and the main areas of the university teacher's individuality develop.

4. Competences of pedagogical management. They involve various forms of interaction between the university teacher and students, both in classroom and in extracurricular work. These competences are expressed in the creative acts by the teacher for management in the educational process, in the original and non-standard solution of management tasks, improvisation and impromptu, both in momentary creativity and in prepared.

5. Competences of interaction. They are realized at different levels. Thus, the university teacher-student interaction is manifested in the training within the framework of corporate strategies and equal partnership cooperation, both in direct personal contact and in the information space (through students' access to the university teacher's electronic resources). At the same time, the teacher should ask questions: "What documents and tasks in the e-learning system will bring to my teaching?", "What extent will they make my teaching effective to?" The next level of interaction competence is the interaction of a university teacher-colleague, both within the university and with other universities. The university teacher is not alone in his teaching mission. It depends on how effectively each teacher cooperates with his colleagues and what the actual teaching team is at the university, including the effectiveness and quality of teaching, the status of the university itself among other universities, etc.

Every university teacher must understand the essence and carry out their activities within the framework of the modern reforms in education. Thus, the interest of the teaching staff of foreign and Russian universities

is aimed at the development of joint programs of various types, which represent the closest form of interaction between universities in the scientific and educational process itself. Programs allow to create new opportunities for the development of educational cultures, the growth of the quality of educational programs, their attractiveness and competitiveness, and on their basis - a new stage in the development of academic mobility of students and teachers, when the international element becomes an integral, internal element of the program itself [8].

The problem of defining the competences of a teacher worries all highly industrialized countries and requires further in-depth study and, possibly, serious changes in the vocational education system. Discussion on competences conceptualization continues in scientific literacy, and each university teacher can take an active part in the discussion. At the same time, the already existing list of competencies provides each university teacher with food for thought about what competences a teacher should have in a 21st century university. In every educational institution, it is necessary to create conditions for the professional development of teaching staff. It will become the basis of this development and will contribute to the continuous professional development of the personality of each university teacher.

References

1. Ala-Mutka K., Punie Y., & Redecker C. Digital competence for life-long learning (policy brief). European Communities. 2008.
2. The Bologna Process. Documents. Retrieved from <http://www.bologna.spbu.ru/question1.php> (20.10.20).
3. Bologna Process // Network conference of the Russian portal of open education "Open European educational space". Retrieved from <http://www.conf.ssu.ru/phorums/red.php> (20.10.20).
4. Cameron E., & Green M. Making sense of change management: A complete guide to the models, tools and techniques of organizational change. Kogan Page Publishers. 2019.
5. Competencies for ESD (Education for Sustainable Development) teachers. A framework to integrate ESD in the curriculum of teacher training institutes / Sleurs, Willy (ed.). Comenius 2.1 project 118277-CP-1-2004-BE-Comenius-C2.1 (pdf).

6. Danilova I.S., Danilova Yu.S. Modern technologies for assessing the quality of language education in higher education. Actual problems of education in higher education: a collection of scientific and methodological articles. -Tula: Publishing house of Tula State University, 2012. P. 70. [in Rus].
7. Daele A. 10 compétences pour enseigner à l'université. Retrieved from <http://pedagogieuniversitaire.wordpress.com/> (20.10.20).
8. International joint programs. Retrieved from <http://www.ntf.ru/p33aal.html> (20.10.20).
9. Romance Council for Education and Development Retrieved from <http://rcfe.ch> (20.10.20).
10. UNESCO (2016). Education 2030 – Incheon Declaration. Paris: UNESCO.

DOI 10.34660/INF.2020.22.91.009

Learning Ornament in Primary School Fine Arts

Polynskaya Irina Nikolaevna

Doctor of Pedagogical Sciences, Associate Professor
Nizhnevartovsk State University

Annotation. *The article reveals the basic principles of teaching the basics of ornamental art in the process of visual activity, and also raises the problem of the formation of ethnocultural competences of primary school-children in the process of teaching folk ornament. The aim of the article is the theoretical and practical aspects of the study of ornament, the role of ornamental composition in the classroom of fine arts in elementary grades. The article emphasizes the idea that ornaments are cyclical and unique in nature. Having studied the basic patterns of the construction of an ornament, students can fantasize on the topics studied, create unique author's sketches of painting. A teacher of fine arts should build work aimed at enhancing cognitive activity, inspire students to in-depth independent study of folk art, develop their aesthetic worldview, artistic taste, through the study of various types of folk art.*

Keywords: *ornament, fine arts, ethnocultural traditions, folk art, junior schoolchildren, teaching principles, techniques, rules, methods, guidelines.*

The content of a modern educational program cannot but include the tasks of ethnocultural education of students. This component is especially important and relevant at the present time, since folk art is gradually fading away, in the age of technology, students lose interest in the original art of their people. The teacher of fine arts is responsible for the preservation and transmission of knowledge about the types, genres and techniques of folk art. Along with the study of historical and technological aspects, educational tasks are carried out in the lessons on the study of folk art, first of all, this is the upbringing of a sense of patriotism and love for the Motherland, the formation of a respectful attitude to historical memory and cultural values and their significance in the world cultural system. "One of the most important conditions for the formation of a personality is the development of creative abilities. Modern society is interested in the rapid forward move-

ment of all spheres of human activity” [4, p. 130].

Modern educational programs involve the study of various types of folk art: pottery, weaving, folk costume, embroidery, weaving, painting, wood carving, forging, modeling. In each of these types of creativity, one of the leading places goes to the ornament. Studying folk artistic traditions within the framework of fine arts lessons, younger students get acquainted with the historical cultural experience of past generations, learn its features and traditions. It should be noted that ornament is one of the brightest elements in the art of all nations. Ornamental compositions are varied and rich in color. Each ornament contains a particle of the history, culture of a particular people. Studying ornament in fine arts lessons at a secondary school, the teacher helps students trace the historical formation of folk art, the fusion of social, aesthetic and cognitive aspects in it.

Studying ornament in the school's fine arts curriculum allows the teacher to maintain cultural identity.

In the lessons of fine and decorative and applied arts, students get acquainted with the cultural characteristics of various peoples, which opens up a broad path in the formation of ethnocultural competencies in primary school students. “The fine arts, especially in the lower grades, is one of the leading places in the process of developing children's creative abilities, creative thinking, familiarizing them with the beauty of their native nature, the surrounding reality, the spiritual values of art” [5, p. 155].

It is important to note the significance and manifestation of cultural characteristics in the life of a particular people. First of all, a teacher of fine arts should build work aimed at enhancing cognitive activity, inspire students to in-depth independent study of folk art, develop their aesthetic worldview, artistic taste, through the study of various types of folk art. After all, it is folk art that can fully be called alive and real. Folk art is the language of culture, of the nation, which is important to preserve and pass on to the younger generation. On the example of studying ornamental compositions, one can illustrate various aspects of a person's everyday life, his cultural values, interaction within society. All this is reflected directly in the elements of the ornament, in its purpose, execution. An ornament is a kind of language with the help of which one could learn a lot about a person, for example, by the ornament on clothes or accessories, one can determine what kind of work a person is engaged in, what family status he is, where he comes from, and much more. An ornament is a unique cipher characteristic of every nation.

Paying special attention to the formation of ethnocultural competences of primary schoolchildren, it should be noted that the studied folk orna-

ment appears before us as a sociocultural component, a mechanism of sociocultural reflection that preserves and passes on the experience of past generations. The ornament, in its essence, is a reflection of the worldview of its generation, it is the bearer of knowledge, culture and values. The beauty and simplicity of the ornament distinguishes it favorably from other methods of preserving information. The art of ornament preserves its own traditions and patterns of construction, clarity, graphics, content and motives of compositions.

It is unambiguous that ornament is a complex phenomenon, with which it is important to acquaint and make friends with every student of elementary school. After all, it is in childhood that the teacher has the opportunity to qualitatively form the socio-cultural side of a person's personality, directing him to the right path of self-development.

First of all, it should be noted that the study of ornament is included in the general course of fine arts at school, and is a significant element for the all-round development of the child's personality. "Visual activity contributes to the development of exclusively positive qualities of the child, motivating him to further creativity" [1, p. 175].

Educational and educational activity, first of all, has a creative, orientation, during which teaching, educating, developing tasks are solved. "The task of the teacher is not so much to help the student in the creation of work, but to ensure the conditions under which the student's potential will be fully used" [6, p. 198].

During the educational process, the teacher must observe the student's work and guide it in the right direction. In no case should a teacher impose his stereotypes and principles on students, going beyond the educational process. "The main task of the teacher is to involve the student in creative activity. A child will be much better at mastering new knowledge and skills if he does not think in a standard way during the study, that is, use his creative abilities" [2, p. 270-271].

Teaching ornament in fine arts lessons, the teacher must observe the general pedagogical principles:

- An important aspect is maintaining a safe and friendly atmosphere in the lesson. A well-built working atmosphere contributes to a better assimilation of educational material by students.
- The studied material should be interconnected. Each stage of work is formed on the basis of the material already studied.
- The ability to study material. It is important to select tasks that will be available to every age.
- An individual approach will help to focus on the characteristics of the

level of development of creative skills of each student. If necessary, the teacher can complicate or simplify the task for the student.

- Dialogue and cooperation between teacher and students. It is important for the teacher to maintain feedback with students throughout the lesson. For this, you can ask leading questions on the topic of the lesson, conduct various kinds of interactive games, quizzes.

- The use of a large amount of visual material. Do not limit yourself to slide presentations, a real object with hand-painted painting or a trip to a museum or an exhibition will cause a greater emotional effect.

- The relevance of the studied material. The material studied must have a response in modern life in order to interest the student.

- Interdisciplinary communication of the studied material. It is important to emphasize that the material being studied is closely related to other sciences. For example, when depicting floral, animalistic ornaments, we recall the knowledge gained in biology lessons.

- The practicality of the knowledge gained. The student can use the acquired knowledge, skills and abilities outside the lessons of fine arts. The acquired creative skills for making an ornament can be used at home, decorating a variety of household items.

Studying ornamental art, students get acquainted with various types and techniques of creating an ornament, try to perform author's fantasy works. The acquired skills will help students develop independently in ornamental art and design. "Exercises should develop a sense of rhythm, movement, depth of space, thinking. The formation of an artistic image in a design model is of great importance" [3, p. 130-131].

Thus, we can say that a variety of pedagogical methods and techniques contributes to the formation of a student's stable interest in creative cognitive activity.

References

1. Melkova E.A. The influence of visual activity on the all-round development of schoolchildren // XX All-Russian student scientific and practical conference of Nizhnevartovsk State University. Digest of articles. Executive editor A.V. Korichko. 2018. pp. 273-275.

2. Polynskaya I.N. Extracurricular work on the fine arts in a secondary school // Contemporary science and education: new approaches and topical research. Materials of the All-Russian Scientific and Practical Conference, 2020, pp. 269-276.

3. Polynskaya I.N. Teaching the basics of design for students of art school // Innovations in science: ways of development. Materials of the XII All-Russian Scientific and Practical Conference. - Cheboksary, 2020. pp. 127-133.
4. Polynskaya IN, Sezenina NV. Formation of artistic and figurative thinking of future teachers of fine arts // Man and education. - 2020. - No. 2 (63). pp. 130-133.
5. Tkacheva L.V. Teaching primary school students the basics of color science in the system of extracurricular activities // Scientific works of undergraduates and postgraduates. Collection of scientific papers. Executive editor D.A. Pogonyshev. - Nizhnevartovsk, 2020. pp. 155-157.
6. Tsibinoga E.G. Development of creative abilities of students in arts and crafts classes // Scientific works of undergraduates and graduate students. - Nizhnevartovsk, 2019. pp. 195-198.

**RUSSIAN DIASPORA AS A FACTOR OF RUSSIAN INFLUENCE IN
THE “NEAR ABROAD”**

Karnaukhova Marina Vladimirovna

Doctor of Pedagogical Sciences, Full Professor
Ulyanovsk State University, Russia

Talina Irina Vladimirovna

Doctor of Pedagogical Sciences, Full Professor
Ulyanovsk State University, Russia

Karnaukhov Vladimir Anatolyevich

Candidate of Pedagogical Sciences, Associate Professor
Ulyanovsk Civil Aviation Institute, Russia

Annotation. *The purpose of this article is to analyze the role of the Russian diaspora in the New Abroad. The Russian diaspora, which arose as a result of the disintegration of the USSR, experienced the tragic consequences of the destruction of a state. As a result many Soviet people found themselves outside their "ethnic" homelands. The political leaders of the Russian Federation ignored the obvious problems of our compatriots, who lived abroad. Only in the late 1990s - early 2000s came an understanding of the importance of the Russian diaspora for ensuring the security and sustainable development of Russia. Relations with compatriots abroad are an important area of the foreign and domestic policy of the Russian Federation today. The Diaspora is one of the tools for building a dialogue with the countries in which this diaspora is located. The strong ties of the diaspora with the homeland help in building communication ties with other states.*

Keywords: *diaspora, ethnopolitical relations, the Near Abroad, integration groups, the post-Soviet space*

The Russian diaspora is the global community of ethnic Russians, which is one of the largest in the world. Currently, about 30 million people live outside the Russian Federation: 20 million live in the Commonwealth of Independent States and 10 million live in other countries.

The strengthening of Russian statehood is impossible without relying on compatriots from the republics of the former USSR. At the present

stage, the Russian diaspora abroad should be regarded as an important demographic, intellectual and socio-cultural resource that can not only increase the effectiveness of foreign policy and economic relations with foreign states, but also contribute to solving the internal problems of modern Russia [2].

In the era when the system of international actors is undergoing significant changes, the diaspora is an important subject for investigation. Over the past decades, diasporas proved their significant strategic and economic potential both as an independent actor and as an instrument of states.

After the disintegration of the USSR, a complex system of ethnopolitical relations developed on the territory of the newly formed republics. The difficult situation in the public environment contributed to the consolidation of the Russian and Russian-speaking population. The aggravated ethnic relations within the republics, the nationalist policy of the governments of the new states had a negative impact on the social, political, economic, psychological situation of society as a whole. The crisis affected one of the most defenseless social groups: national minorities. The assimilation policy of these states towards national minorities contributed to the dissolution of their cultural identity. The lack of attention to this issue and support from the local authorities contributed to the massive expulsion of the non-indigenous population from the neighboring countries.

After the disintegration of the USSR, the mutual integration of the newly independent states could help to resolve social tensions and soothe the consequences of the crisis. Economy was one the main areas of cooperation. The newly independent states were reluctant to discuss the problems of the Russian diaspora on a multilateral basis, preferring to resolve all acute issues within the framework of bilateral relations.

Russian culture, the Russian language received the undesirable status on the territory of most of the post-Soviet republics. Along with the growth of nationalist sentiments in the newly independent states, the Russian language was rapidly losing its position. The former dominant position of the Russian language was defined as a consequence of the policy of the USSR, and as part of active nationalization, its status was downgraded in many cases to the language of national minorities, as it became in the Baltic states.

Schools teaching the Russian language began to close, broadcasting in Russian was reduced, the publication of newspapers in Russian diminished. The large Russian diaspora found itself in an unfavorable political, legal and socio-economic situation, which required close attention of the Russian and world community [1]. The problems of the Russian and

Russian-speaking population of the Near Abroad could be resolved only through a constructive multilateral contractual process, one of the participants in which should be the Russian diaspora.

The main task of Russian government in the current situation was to defend the interests of the Russians, whose rights, dignity and honor were infringed upon in the course of the rapid sovereignty of the former Soviet republics. Discrimination against the Russians in neighboring countries became an indispensable attribute of national self-affirmation in the post-Soviet space. For a long time, due to objective and subjective reasons, the political leaders of the Russian Federation ignored or neglected the obvious facts of oppression of our compatriots, who lived abroad. Only in the late 1990s - early 2000s came an understanding of the importance of the Russian diaspora for ensuring the security and sustainable development of Russia, preserving the integrity of its borders [1].

The Russian diaspora retains a significant intellectual and demographic potential that can help solve economic, social problems. It can solve many other internal problems in Russia, as well as contribute to the growth of Russia's influence not only in the Near Abroad, but also in world geopolitics.

One of the first integration groups in the post-Soviet space was the organization of the CIS (the Commonwealth of Independent States). This organization was supposed to preserve the regional unity of the former republics and bind them with close economic, social and legal ties, but not everything was realized. Over time, new organizations began to appear with a more specific set of tasks: OSCE, EurAsEC and others. These organizations today are engaged in the settlement of the most difficult issues for the newly independent states: economic development, migration policy, military-strategic partnership, etc.

The lack of a scientific and technological base was experienced at the beginning of the formation of the state policy of support. The policy was carried out inconsistently, experimentally, creating new difficulties while building relationships with compatriots. This situation continued for a long time, that is why governmental programs were seriously criticized. Nevertheless, many of the programs to support compatriots work and benefit today. This is the best evidence of progress in this area of Russian public policy. Bilateral agreements were signed between the Russian Federation and the newly independent states, which are aimed at settling the most vital issues for the Russian diaspora: citizenship, cultural policy, migration, language and etc.

In the course of time, Russia's relations with the former Soviet republics

became more stable, and the Russian government began to pay more attention to the compatriots abroad. Within the framework of the new partnership, it was possible to consolidate or return the status of the Russian language in some countries but it became the language of interethnic communication. The new organizations were opened in the Near Abroad countries and in Russia in order to strengthen cultural interaction. A large role is also played by specially created international foundations and associations of Russian compatriots, as well as cooperation within the framework of education, on the basis of Russian universities.

There are a number of state programs that contribute to solving the migration problems of the Russian and Russian-speaking population, in particular, the issues of repatriation. The most important program is the Program for Assisting the Resettlement of Compatriots from the Near Abroad. Within its framework, everyone who is in the category of compatriots has the opportunity to get Russian citizenship and receive support with accommodation and naturalization. The program works due to the general Concept of Russia's migration policy. There are also programs to help relocate refugees from zones of armed conflict. The Russian and Russian-speaking population returning to their historical homeland is capable of influencing the demographic, personnel and social situation in Russia.

Explicit anti-Russian sentiments painfully affected the representatives of the Russian diaspora. On the one hand, this left a strong psychological imprint, but on the other hand, it contributed to the consolidation within the diaspora. The level of this consolidation has increased significantly because of the help of Russian policy. Coordination councils were created, compatriots can get information and legal support.

There are many significant compatriots' organizations in the post-Soviet space. Some have assumed quite specific functions, such as human rights activities, teaching and learning the Russian language, etc.

The Foreign Policy Concept of the Russian Federation emphasized the importance of the Russian diaspora in Russian foreign policy, in particular, it states, "Russian citizens and compatriots living abroad can get comprehensive effective protection of their rights and legitimate interests "[3].

The diaspora retains significant economic, demographic and strategic potential for Russia. The Diaspora is one of the tools for building a dialogue with the countries in which this diaspora is located. The strong ties of the diaspora with the homeland help in building communication ties with other states. The influx of people from the diasporas makes it possible to replenish the demographic reserves of Russia, as well as to obtain highly qualified specialists, including those who have work experience in another

state and are familiar with the specifics of working abroad.

Thus, despite the fact that the structure of relations between Russia and its diasporas in the neighboring countries, in view of some of its historical and ethnopolitical reasons, is still not strong enough, in comparison with similar structures in China or Armenia, Russia continues to strengthen these ties. The potential of the Russian diaspora is still enormous.

References

1. Kozubenko I.I. The collapse of the USSR and the formation of a new configuration of ethnopolitical relations in the post-Soviet space // Scientific notes of the Russian State Social University, 2004. - No. 3. - P. 23-34.

2. The Russian diaspora in the neighboring countries: social status, cultural level, communication with compatriots: 1992-2004: abstract of thesis. ... doctors of historical sciences: 07.00.02 / Kozubenko I. I. - Moscow, 2008. - 32 p.

3. Concept of foreign policy of the Russian Federation: November 30, 2016 No. 640. // Collected Legislation of the Russian Federation of 2016, No. 49, art. 6886.

DOI 10.34660/INF.2020.65.66.011

DIGITALIZATION OF THE RUSSIAN HIGHER EDUCATION SYSTEM

Solomatina Elena Nikolaevna

Candidate of Sociological Sciences, Associate Professor
Lomonosov Moscow State University

Abstract. *The article reveals the features of digitalization of the educational environment in the conditions of modern Russian society. The relevance of this topic is due to the active dissemination of new digital technologies in the educational environment in order to effectively integrate all its participants into new information spaces and gain access to the most relevant scientific information.*

Keywords: *digitalization, educational process, smart education, mobility.*

The active spread of new digital technologies in various spheres of modern Russian society has affected the educational environment, which is due to the objective processes of the development of the global Internet and other information technologies. On their basis, "information spaces are created, which include databases with scientific and business information, which contribute to the free circulation of knowledge"¹. In the conditions of modern Russian society, the higher education system is faced with the task of integrating students into the information space, providing them with access to the most relevant knowledge and technologies necessary for the successful development of the chosen specialty and the formation of professional competencies quoted on the labor market.

In this regard, the most relevant is the sociological analysis of the digitalization of the educational process in order to effectively integrate all its participants into new information spaces and gain access to the most relevant scientific information.

It should be noted that in the context of the spread of coronavirus infection COVID-19 in the Russian Federation and the city of Moscow, restrictive measures were introduced and a complete transition to distance

¹ Tikhomirov V.P., Dneprovskaya N.V. Smart education as the main paradigm for the development of an information society // Modern information technologies and IT education. 2015. №11. P. 9.

learning was carried out, which significantly changed the course and organization of the educational process, accelerating the transformation of the traditional model of the educational process into a digital one.

The scientific elaboration of this topic is represented by the works of both foreign (G. Thorp, B. Goldstein, R. Baker, K. Yatsef, K. Romero, S. Ventura) and domestic researchers (Tikhomirova V.P., Dneprovskaya N.V., Tulchinsky G.L., Nikulina T.V., Starichenko E.B., Popova O.I., Aleshkina O.V., Apokina K.V.), in which the problem of the formation of digital education is comprehensively considered².

Researchers such as T. Yu. Bystrova, V. A. Larionova, E. V. Sinitsyn, A. V. Tolmachev, and U.S. Zakharova and others³ studied the possibilities of using new technologies to create a digital educational environment.

As a methodological model for studying the digital educational process, according to a number of researchers, smart technologies should be used as replacing the usual information technologies, which will become decisive at this stage of society development. The education system is undergoing changes not only in the field of content and teaching methods, but also in the field of tools, environments and ways of mastering knowledge⁴.

Smart education itself as a model of education is an organized interaction of the subject of science, student, teacher and other participants in the process, carried out using technical innovations, aimed at the formation of a multidimensional systemic vision of the subject of science⁵.

2 Baker R., Yacef K. The state of educational data mining in 2009: A review and future visions // *Journal of Educational Data Mining*. 2009. V. 1, N 1. P. 3 – 17; Tikhomirov V.P., Dneprovskaya N.V. Smart education as the main paradigm for the development of an information society // *Modern information technologies and IT education*. 2015. №11. P. 9 – 13; Tulchinsky G.L. Digital transformation of education: challenges to higher education // *Digital civilization: challenges and transformations of our time*. 2017. № 6. P. 121–136; Popova O.I. Transformation of higher education in the digital economy // *Management issues*. 2018. №5 (35). [Electronic resource] URL: <https://cyberleninka.ru/article/n/transformatsiya-vysshego-obrazovaniya-v-usloviyah-tsifrovoy-ekonomiki> (Appeal date: 25.09.2020); Nikulina T.V., Starichenko E.B. Informatization and digitalization of education: concepts, technologies, management // *Pedagogical Education in Russia*. 2018. № 8. P. 107 – 113; Aleshkina O.V., Apokina K.V. Digitization of society: the role and prospects of education // *Economics and Management: scientific and practical journal*. 2019. №4. P. 8 – 11.

3 Bystrova T. Yu., Larionova V. A., Sinitsyn E. V., Tolmachev A. V. Educational analytics of MOOC as a tool for predicting the success of students // *Education Issues / Educational Studies Moscow*. 2018. № 4. P. 139 – 166; Zakharova U.S. MOOC production at the university: goals, achievements, barriers // *University management: practice and analysis*. 2019. № 4. P. 46 – 68.

4 Tikhomirov V.P., Dneprovskaya N.V. Smart education as the main paradigm for the development of an information society // *Modern information technologies and IT education*. 2015. №11. P. 10.

5 Ibid. P. 10.

It should be noted that the development of a complex of information and communication technologies (ICT) and their active use in the educational process contributes to the transition to a new quality of relations in the systems student - university, student - teacher, teacher - university, university - state, university - business. The subjects of these relationships have the opportunity of instant feedback and response to changes in the environment⁶.

In this aspect, the existence of the so-called "digital divide" should be noted, overcoming which the country is reaching a qualitatively new level in its digital development. The essence of the first digital divide lies in the lag of some countries in the level of development of the IT industry, which manifests itself in insufficient equipment, low Internet coverage of the population, and insufficient user qualifications. At the moment, Russia has managed to bridge this gap: universities and schools have been equipped with computers and the Internet⁷.

Thus, the number of Internet users in Russia, according to the analytical department of the Russian Association for Electronic Communications, at the beginning of 2019 amounted to 93 million people. Over the past three years, according to the report, the Internet audience has grown by 7%⁸. According to statistics, the number of personal computers used for educational purposes per 100 people in an educational organization at the end of 2017 in Russia amounted to 23.4 in higher education organizations⁹.

Thus, we can state that the Russian Federation has overcome the first digital divide, which means that it is moving to the next stage of digital development - to the second digital development.

The second digital divide is characterized by the fact that knowledge becomes open and accessible, the presentation of which can attract the attention of other people. The active use of new knowledge in open resources is becoming a characteristic feature of the second digital divide¹⁰.

6 Tikhomirov V.P., Dneprovskaya N.V. Smart education as the main paradigm for the development of an information society // Modern information technologies and IT education. 2015. №11. P. 9.

7 Tikhomirov V.P., Dneprovskaya N.V. Smart education as the main paradigm for the development of an information society // Modern information technologies and IT education. 2015. №11. P. 11.

8 Internet in Russia in 2018: State, Trends and Development Prospects [Electronic resource] URL: <https://raec.ru/upload/files/190617-fpmk-2019.pdf> (Appeal date: 06.11.2020).

9 Education in figures: 2019: a short statistical collection / N.V. Bondarenko, L.M. Gokhberg, N.V. Kovaleva et al.; Nat. res. un-ty "Higher School of Economics". M.: NRI HSE, 2019. P. 80.

10 Ibid. P. 80.

At the moment, bridging the second digital divide is an urgent area of activity for Russia in the field of education. This is evidenced by the level of development of various online educational platforms and forms of distance learning.

The concept of smart education is based on the following methodological principles:

Firstly, the principle of using the most relevant information in the educational program for solving educational problems. As the speed of information flow increases, educational materials should be constantly replenished with information obtained on the basis of the real state of affairs. This approach contributes to the development of students' practical problem solving skills based on a real relevant situation.

Secondly, the principle of independent organization by students of their educational, research and project activities. This principle becomes key in the context of the growing importance of creativity in human activities.

Thirdly, the educational process takes place in a distributed educational environment. That is, the learning process is now not limited to either the audience, or the university as a whole, or even the distance learning system. The learning process is continuous; it also includes training directly in a professional environment.

Fourth, interaction between students and the professional community is becoming more and more active. The professional environment is becoming a participant in the educational process; companies are increasingly attracting students to solving real-life problems.

Fifth, there is an individualization of learning through the introduction of individual educational trajectories. In connection with the intensive development of technologies, the field of education is expanding due to the attraction of those who are already working in the higher education system, changing their specialization. The task of the university is to provide quality educational services in accordance with the needs and capabilities of students.

Sixth, universities strive to provide access to educational programs for students, taking into account their individual characteristics, health opportunities and social status¹¹.

So, when introducing innovative technologies, the traditional model of education inevitably undergoes significant changes associated with fundamentally new technological features of the information society, and there is a gradual reorientation towards the model of smart education.

¹¹ Tikhomirov V.P., Dneprovskaya N.V. Smart education as the main paradigm for the development of an information society // Modern information technologies and IT education. 2015. №11. P. 12.

The digital resources that a person possesses in the implementation of his daily activities make it possible to overcome many barriers in the classical model of education: the choice of forms and methods of teaching, the pace of mastering materials, the choice of a teacher. Therefore, the education system must meet the requirements of modern realities in order to ensure the successful entry of society into the digital age¹².

For the successful organization of the digital educational process in the conditions of modern Russian society, a functional regulatory and legal framework is required. In this regard, the following regulatory legal acts were approved: Federal Law of 29.12.2012 № 273-fz (as amended on 31.07.2020 with amendments that came into force on 01.09.2020) "On Education in the Russian Federation"; Decree of the President of the Russian Federation dated 09.05.2017 № 203 "On the Strategy for the Development of the Information Society in the Russian Federation for 2017 - 2030"; Decree of the Government of the Russian Federation of 18.04.2016 № 317 "On the implementation of the national technological initiative"¹³.

To reorient the education system in the Russian Federation in 2016, the federal project "Modern digital educational environment in the Russian Federation" was launched, adopted and approved by the Government of the Russian Federation in connection with the implementation of the state program "Development of education" in the period from 2013 to 2020¹⁴.

This project is aimed at "modernizing the education and vocational training system, bringing educational programs in line with the needs of the digital economy, widely introducing digital tools for educational activities and integrating them into the information environment, providing the opportunity for citizens to study according to an individual curriculum throughout life - anytime, anywhere"¹⁵. The main goals of this project are, firstly, the implementation of access to many online courses on the principle of "one

12 Nikulina T.V., Starichenko E.B. Informatization and digitalization of education: concepts, technologies, management // Pedagogical Education in Russia. 2018. № 8. P. 108.

13 On education in the Russian Federation: Federal Law № 273-fz of 29.12.2012 (as amended on 31.07.2020 with amendments that came into force on 01.09.2020) [Electronic resource] URL: <https://zakonbase.ru/zakony/ob-obrazovanii/> (Appeal date 09.10.2020); On the strategy for the development of the information society in the Russian Federation for 2017–2030: Decree of the President of the Russian Federation of 09.05.2017 № 203. [Electronic resource] URL: <http://kremlin.ru/acts/bank/41919> (Appeal date 12.11.2020); On the implementation of the national technological initiative: Resolution of the Government of the Russian Federation of 18.04.2016 № 317 [Electronic resource] URL: <http://base.garant.ru/71380666/> (Appeal date 12.10.2020).

14 Project "Modern digital educational environment in the Russian Federation" [Electronic resource] URL: <http://neorusedu.ru/> (Appeal date 12.11.2020).

15 Nikulina T.V., Starichenko E.B. Informatization and digitalization of education: concepts, technologies, management // Pedagogical Education in Russia. 2018. № 8. P. 108.

window", that is, the availability of an information resource that unites various online platforms and many online courses. So, the developers of the project note that now there are many foreign and domestic online courses and educational platforms, however, quite a significant amount of time is spent looking for a suitable course and assessing its usefulness. The unified platform will allow people to quickly and efficiently find the courses they need, regardless of where they live or where they are educated.

Secondly, the program provides for the introduction of a multi-stage system for assessing the quality of online courses. This format must comply with the technical requirements of the resource, the legislation of the Russian Federation, and also comply with the standards in the field of content.

Thirdly, Regional Centers of Competence in the field of online learning (RCCOO) are being created, that is, the infrastructure aimed at training teachers and administrative personnel for the successful implementation of digital education practices¹⁶.

Fourthly, the project provides for the professional development of teachers in the development, use and examination of online courses. The development of online learning is impossible without the development of teachers' skills in this area. The priority here is to teach teachers to create online courses on their own. Another area of professional development is the ability to use modern educational resources in the educational process. The third area of activity under this project item is the establishment of an expert community that could assess the content of online courses and their compliance with the developed standards¹⁷.

In order to fully analyze the transformations taking place in the Russian system, it is also necessary to take into account the statistical data characterizing the development of digital education in Russia. During the monitoring of students' digital competencies, the following data were obtained. 89% of students have skills in working with applied programs (hereinafter - students undergraduate, graduate, and specialty programs). At the same time, the distribution between urban and rural residents is 91 and 83 percent, respectively¹⁸.

On average, 66% of students had skills in working with digital equip-

16 Nikulina T.V., Starichenko E.B. Informatization and digitalization of education: concepts, technologies, management // Pedagogical Education in Russia. 2018. № 8. P. 108.

17 Project "Modern digital educational environment in the Russian Federation"[Electronic resource] URL: <http://neorusedu.ru/> (Appeal date 12.11.2020).

18 Education in figures: 2019: a short statistical collection / N.V. Bondarenko, L.M. Gokhberg, N.V. Kovaleva et al.; Nat. res. un-ty "Higher School of Economics". M.: NRI HSE, 2019. P. 82.

ment, including 69% and 53% - urban and rural residents¹⁹. Communication skills in a digital environment are possessed by an average of 85% of students, 87% and 75% of urban and rural students, respectively²⁰.

The use of the Internet for learning and self-education is presented as follows. To obtain knowledge and information on any topic using Wikipedia, online encyclopedias, 72% and 49% of students in urban and rural areas, respectively, use it. 41% and 26% of urban and rural students use the Internet to read or download online newspapers or magazines, e-books, respectively. To search for information about education, training courses, trainings - 35% and 26% of students in urban and rural areas, respectively. For distance education, the Internet is used by 14% and 9% of students in urban and rural areas, respectively. To participate in professional social networks - only 3% of students in both urban and rural areas²¹.

Thus, we can conclude that the most developed among students are skills in working with applied programs, that is, working with a text editor, with spreadsheets, creating electronic presentations, using programs to edit files; and digital communication skills, including email, video and audio calls over the Internet, uploading personal files to websites and social media.

It is also important to note that there is a clear gap in the possession of the above skills among residents of urban and rural areas, which demonstrates the presence of a digital divide. That is, when implementing the transition to a digital education model, the problem of an unequal degree of digitalization in cities and villages arises.

Thus, the features of the digital educational environment in the conditions of modern Russian society are: a change in the professional practice of teachers, an increase in the importance of student independence in the educational process, a change in the educational process towards an increase in the structure of the educational process, a decrease in the duration of training courses, the formation of a modular system of the educational process, an increase in the possibility of academic mobility, the growing importance of interactive and multimedia teaching methods.

To implement a systemic and effective final transition from a traditional to a digital education model, a radical restructuring of the entire higher education system at the state level, the introduction of modular digital educational environments is required.

¹⁹ Ibid. P. 84.

²⁰ Ibid. P. 86.

²¹ Education in figures: 2019: a short statistical collection / N.V. Bondarenko, L.M. Gokhberg, N.V. Kovaleva et al.; Nat. res. un-ty "Higher School of Economics". M.: NRI HSE, 2019. P. 92.

References

1. Baker R., Yacef K. The state of educational data mining in 2009: A review and future visions // *Journal of Educational Data Mining*. 2009. V. 1, N 1. P. 3 – 17; Tikhomirov V.P., Dneprovskaya N.V. Smart education as the main paradigm for the development of an information society // *Modern information technologies and IT education*. 2015. №11. P. 9 – 13; Tulchinsky G.L. Digital transformation of education: challenges to higher education // *Digital civilization: challenges and transformations of our time*. 2017. № 6. P. 121–136; Popova O.I. Transformation of higher education in the digital economy // *Management issues*. 2018. №5 (35). [Electronic resource] URL: <https://cyberleninka.ru/article/n/transformatziya-vysshego-obrazovaniya-v-usloviyah-tsifrovoy-ekonomiki> (Appeal date: 25.09.2020); Nikulina T.V., Starichenko E.B. Informatization and digitalization of education: concepts, technologies, management // *Pedagogical Education in Russia*. 2018. № 8. P. 107 – 113; Aleshkina O.V., Apokina K.V. Digitization of society: the role and prospects of education // *Economics and Management: scientific and practical journal*. 2019. №4. P. 8 – 11.
2. Bystrova T. Yu., Larionova V. A., Sinityn E. V., Tolmachev A. V. Educational analytics of MOOC as a tool for predicting the success of students // *Education Issues / Educational Studies Moscow*. 2018. № 4. P. 139 – 166; Zakharova U.S. MOOC production at the university: goals, achievements, barriers // *University management: practice and analysis*. 2019. № 4. P. 46 – 68.
3. Internet in Russia in 2018: State, Trends and Development Prospects [Electronic resource] URL: <https://raec.ru/upload/files/190617-fpmk-2019.pdf> (Appeal date: 06.11.2020).
4. Nikulina T.V., Starichenko E.B. Informatization and digitalization of education: concepts, technologies, management // *Pedagogical Education in Russia*. 2018. № 8.
5. On education in the Russian Federation: Federal Law № 273-fz of 29.12.2012 (as amended on 31.07.2020 with amendments that came into force on 01.09.2020) [Electronic resource] URL: <https://zakonbase.ru/zakony/ob-obrazovanii/> (Appeal date 09.10.2020); On the strategy for the development of the information society in the Russian Federation for 2017–2030: Decree of the President of the Russian Federation of 09.05.2017 № 203. [Electronic resource] URL: <http://kremlin.ru/acts/bank/41919> (Appeal date 12.11.2020);

- On the implementation of the national technological initiative: Resolution of the Government of the Russian Federation of 18.04.2016 № 317 [Electronic resource] URL: <http://base.garant.ru/71380666/> (Appeal date 12.10.2020).
6. Education in figures: 2019: a short statistical collection / N.V. Bondarenko, L.M. Gokhberg, N.V. Kovaleva et al.; Nat. res. un-ty "Higher School of Economics". M.: NRI HSE, 2019.
 7. Project "Modern digital educational environment in the Russian Federation" [Electronic resource] URL: <http://neorusedu.ru/> (Appeal date 12.11.2020).
 8. Tikhomirov V.P., Dneprovskaya N.V. Smart education as the main paradigm for the development of an information society // Modern information technologies and IT education. 2015. №11.

L2 PHONETICS INSTRUCTION: WHICH ENGLISH TO TEACH TODAY?

Elena E. Muromtseva

student

Lomonosov Moscow State University

Abstract. *This article examines the consequences of English becoming an international means of intercultural communication – lingua franca of the globalised world – for the approach to teaching English phonetics to learners with different L1 backgrounds in terms of the choice of a pronunciation model. The paper analyses the shift of the learners' attitude towards foreign accent reduction and becoming aware of English language varieties, in particular, different variants of spoken English.*

Keywords: *English as a lingua franca, ELF, English as an international language, globalisation, non-native speakers of English, oral intercultural communication, phonetics, phonology, lingua franca core, LFC, foreign accent, language variety, pronunciation model.*

Introduction

English has existed as a lingua franca in different parts of the world throughout its historical development, but over the past decades it has become a leading means of communication between non-native English speakers. Globalization has turned out to be a powerful stimulating factor in the intensive mixture of nationalities, cultures and languages, the expansion of the scale of linguistic globalization with the increasing role of the English language as a "lingua franca" in the intercultural communication.

Today, interactions in English as a lingua franca (ELF) are understood as verbal interactions in English between non-native interlocutors with different L1 backgrounds. English as a lingua franca is characterized by the variability of the norm, varying degrees of confidence in the proficiency of the language by its users, openness and readiness to introduce forms of other languages into the lingua franca language system.

ELF: modern sociolinguistic research

As noted by J. Jenkins (2015), in the 1990s, linguistic studies of the

English language as a lingua franca were aimed at comparing the language of the outer and expanding circles with the language of native speakers (the language of the inner, outer and expanding circles according to B. Kachru's classification). The linguist draws attention to the change in the view of this problem since the beginning of the XXI century: the globalised world of the XXI century imposes new requirements on tolerance, both in general and, in particular, in the field of learning English as a means of international communication – the change in the nature of the use of various linguistic units is largely perceived as a manifestation of the creative and adaptive activities of non-native English users.

One of the goals of modern sociolinguistic research in the field of ELF is to analyse pragmatic competence based on how L2 users of English cope with a communicative task adequately using a set of acquired communicative strategies (Taguchi, Ishihara, 2018). Modern researchers do not perceive the existence of a "monolithic" variety of English as a lingua franca in the present or the near future as possible (Jenkins, 2015); on the contrary, they are convinced that non-native interlocutors engaged in intercultural and international communication in English have to be sufficiently aware of the existence of a complex of phonetical and phonological, lexical, grammatical and other forms and features of the English language widely used in present-day speech, so that they could understand and use them to achieve effective communication.

Lingua franca allows non-native speakers of English to deal with many aspects of their lives every day, to carry out their activities in a globalised world belonging to the international community of professionals. The lingua franca is perceived as a functional tool for the communication between interlocutors with different L1 backgrounds brought together in a communicative act, for example, in business communication, communication in the field of politics or science, both orally and in writing. Regardless of the form of this communication, which implies the use of English as a lingua franca, and the incentives of non-native speakers actively involved in the process of intercultural and international communication, the achievement of the effectiveness and expediency of such communication, brevity in the use of linguistic means, clarity of wording in the process of language acquisition are, according to Seidlhofer (Seidlhofer, 2001), of paramount importance for users of English as a lingua franca.

Teaching English phonetics in the context of ELF

Before the emergence of the communicative approach in the second half of the XX century teaching pronunciation of a foreign language was

either not a priority, or aimed at maximum accent reduction so as to be understood by the community of native speakers; the primary goal of a language curriculum was teaching other linguistic skills. In the 1980s, according to Rahimi and Ruzrokh (2016), “the goal of pronunciation instruction has changed from accuracy to intelligibility”, this tendency predetermined the need to revise the goals of teaching a foreign language, in particular, English.

In accordance with the goal of learning English as a means of international communication between the representatives of different cultures, there is a change of perspective from teaching English with a focus on native speakers to becoming aware of different variants of English for successful oral intercultural communication. In this regard, sociolinguistic research of L2 learners of English not only should analyze what these students know about the target language and its varieties, but also how this knowledge is classified in the student's mind and used to reflect and clarify the preferences and priorities of the group.

The relationship that language learners have with the varieties of English speech is also considered important for research and description. Friedrich (2000) argues that teachers and language policy makers need to be aware of their students' attitudes towards different varieties of English in order to fully meet their learning needs and deal with the mixed feelings that English evokes as a means of international communication. Starks and Paltridge (1996) explain that the choice of the English language model for teaching and learning depends on the attitude of students towards English, this is why it is of paramount importance to find out which version of English as their second language and as a foreign language they prefer and want to study. In particular, scientists emphasise the need to research the attitude towards the studied foreign language and its manifestations, in which non-native speakers are used as informants, in order to figure out the change in the attitudes towards linguistic processes and phenomena among various segments of the population studying the English language.

The Lingua Franca Core: ideal solution?

Modern linguists offer a new approach to teaching the phonetics of the English language: in linguistic circles phoneticians and sociolinguists have started broaching the subject of a "common phonetic base" (The Lingua Franca Core (LFC)). This common phonetic base is now understood as the minimum set of pronunciation features necessary for successful communication between non-native speakers of English with different L1 backgrounds. For the first time this concept was identified and brought up for

scientific discussion by B. Jenner (Kosheleva, 2018). Subsequently, a new model of teaching phonetics was proposed and developed at the very beginning of the XXI century by the applied linguist J. Jenkins, intended for millions of people around the world, L2 learners of English, for whom the teaching of speaking and language in general is not focused on imitating the speech of native speakers and forgoing a foreign language accent completely, on the contrary, they should strive to achieve mutual understanding with native speakers of English and non-native English users with the orientation on the common phonetic base in oral speech interactions.

Currently, within the framework of the general concept of tolerance, there is a change in attitudes not only towards regional accents, but also towards the concept of foreign accent on the whole (Kolesnikova, Korenev, 2015). Now, the elimination of the accent is often perceived as the removal of one of the parts of a person's personality and national identity. That is why today linguists and phoneticians the world over are concerned with "softening" an accent, without changing it completely, in order to speak "clearly", not "correctly", so that it does not constrain communication (Lavelle, 2019). Despite this, the RP standard continues to be an indicator of a person's status; it is still used by many public and state leaders, clergymen, university professors, senior officers, radio and television announcers (Abramova, 2010).

The model proposed by J. Jenkins is based on the concept of the World Englishes Paradigm which describes the existence of more than 300 million non-native speakers of the English language who use this language on a regular basis as a means of communication with the same non-native speakers rather than with representatives of the inner circle (the native speakers) according to B. Kachru's classification (Dauer, 2005). J. Jenkins (2002) refers to LFC as "the basis of the curriculum in phonetics for learners of the English language as a means of international communication" and explains that LFC is a description of the set of phonetic and phonological features of English formed on the basis of the study of communicative adaptations and phonetic and phonological errors leading to a misunderstanding of the meaning of the message by the participants of the communicative act. Accordingly, everything that is not included in the set of pronunciation features of the general phonetic base should remain outside the scope of training. However, Rahimi and Ruzrokh (2016) argue that LFC as the main approach to teaching phonetics, given its simplicity in comparison with a standardised English instruction, is not embraced unanimously within the community of educators who teach English phonetics as a means of oral international and intercultural communication.

Conclusion

On balance, when choosing a pronunciation model for English instruction in the framework of English being a global means of international communication it is vital to primarily take course's desired outcomes and learners' attitudes into consideration, but not advantages of the chosen pronunciation model exclusively. As Ugarte Olea contends (2019), "learners' goals, and their L1 backgrounds should be considered when choosing an L2 English pronunciation model". Therefore, LFC as the base for phonetics curriculum should be preferred only if ESL educators are convinced of its suitability for the students' needs in a given learning context regardless of how applicable in terms of tolerance and diversity LFC as a pronunciation model seems.

References

1. Abramova I. E. Foneticheskii aktsent: osobennosti sotsiokul'turnogo vospriyatiya [Phonetic accent: features of sociocultural perception], Vestnik SPBGU [Saint-Petersburg State University Bulletin], 2010, no. 1, pp. 90-98. (In Russ.).
2. Dauer, R. M. (2005). The Lingua Franca Core: A New Model for Pronunciation Instruction? TESOL Quarterly, 39(3), 543-550
3. Friedrich, P. 2000. English in Brazil: Functions and attitudes. World Englishes 19(2):215–224.
4. Jenkins, J. (2002). A Sociolinguistically Based, Empirically Researched Pronunciation Syllabus for English as an International Language. Applied Linguistics, 23(1), 83–103
5. Jenkins, J. (2015). Global Englishes. A resource book for students, 3rd edition (Routledge English Language Introductions), Abingdon, GB. Routledge, 280 pp.
6. Kolesnikova A.N., Korenev A.A. 2015. Vospitanie tolerantnosti k akcentam inostrannoj rechi na urokah po fonetike v jazykovom vuze [Teaching tolerance to foreign accents at phonetics lessons in language colleges]. Moscow State University Bulletin. Series 19: Linguistics and Intercultural Communication, no. 4, pp. 138-147. (In Russ.)

7. Kosheleva I. N. Obuchenie angliiskomu proiznosheniyu: sovremennye tendentsii v zarubezhnykh issledovaniyakh [Teaching English pronunciation: current trends in foreign studies], *Otechestvennaya i zarubezhnaya pedagogika* [Domestic and foreign pedagogy], 2018. Vol. 1, no. 5 (54), pp. 135–150. (In Russ.).
8. Lavelle, D. (2019). The rise of ‘accent softening’: why more and more people are changing their voices. *The Guardian*, 20 March. <https://www.theguardian.com/society/2019/mar/20/ugly-rise-accent-softening-people-changing-their-voices> Accessed 10 November 2020.
9. Rahimi, M., & Ruzrokh, S. (2016). The impact of teaching Lingua Franca Core on English as a foreign language learners’ intelligibility and attitudes towards English pronunciation. *Asian Englishes*, 18(2), 141–156.
10. Seidlhofer, B. (2001). Closing A Conceptual Gap: The Case For A Description Of English As A Lingua Franca. *International Journal of Applied Linguistics*, 11(2), 133–158.
11. Starks, D., and B. Paltridge. (1996). A note on using sociolinguistic methods to study nonnative attitudes towards English. *World Englishes* 15(2):217–224.
12. Taguchi, N., & Ishihara, N. (2018). The Pragmatics of English as a Lingua Franca: Research and Pedagogy in the Era of Globalization. *Annual Review of Applied Linguistics*, 38, 80–101.
13. Ugarte Olea, Marco Sandro Antonio. (2019). The Lingua Franca Core: A Plausible Option?. *How*, 26(2), 75-87.

METAPHORS IN THE LANGUAGE OF MANSI FAIRY TALES

Panchenko Ludmila Nikolaevna

Research Officer

Ob-Ugric Institute of Applied Research and Development

Abstract. *This article discusses metaphors as one of the types of expressive means of language. Based on the material of generally accepted classifications of metaphors, the frequency of their use in Mansi tales is revealed, examples are given*

Keywords: *metaphor, Mansi fairy tale, types and types of metaphors*

When we talk about figurative means, first of all, we are talking precisely metaphors that create vivid, amazing and individualized images. It is the freshness, the novelty of a metaphor that is one of its main features as a figurative means.

The concept of metaphor is defined in different ways in special literature. For example, in the "New Reference Book on the Russian Language and Practical Style", the author I.B. Golub, this is how he interprets this term: Metaphor - "transfer" of a name from one object to another on the basis of their similarity [1, 229]; In the "Stylistic Encyclopedic Dictionary of the Russian Language" edited by M.N. Kozhina, the lexical meaning of a metaphor is defined as "... a word or a turn of speech used in a figurative sense to define an object or phenomenon based on some analogy, similarity" [2, 458]. A more detailed definition is given in Wikipedia: "Metaphor (ancient Greek μεταφορά "figurative; figurative meaning", from μετά "above"+ φέρω "carrying") is a word or expression used in a figurative meaning, which is based on a comparison of an object or phenomena with any other on the basis of their common feature. The term belongs to Aristotle and is associated with his understanding of art as an imitation of life [3]. The similarity in a metaphor can be both external and internal.

In terms of structure, metaphors are simple (built on the convergence of objects or phenomena on some common subject for them) and expanded (built on various associations of similarity).

Metaphor as a phenomenon covers various fields of knowledge, linguistics, philosophy, logic, psychology and other sciences. In linguistics,

for example, it is argued that all human activities are associated with metaphor.

Scientists believe that metaphor is the most popular means of creating images because our consciousness is metaphorical. For example, A.N. Baranov, considers the metaphor not just a "linguistic decoration", but a tool for cognizing reality as a means of organizing the experience of human interaction with the outside world [4].

While researching the Mansi language, many scholars argued that the Mansi language is poor and of little interest. We consider this opinion to be wrong. For example, Mansi fairy tales are rich not only in their plot diversity, but also in many unique pictorial and expressive means. There are also metaphors among them. In his work "The Language of the Mansiysk Tale" A.N. Balandin devoted very little space and attention to Mansi metaphors. He argued that "there are only a few metaphors in the material of fairy tales" [5]. This remark is due to the fact that at that time the Mansi language was poorly studied. The Mansi language has a huge number of metaphors, both in everyday language and in fairy tales. Only native speakers don't think about it. Almost every lexical unit of the language has a hidden comparison. For example, the simplest ones that we use every day without thinking about it. These are words like *щайпут нёл* 'teapot spout', *щайпут алы* 'teapot lid', *лӓгыл нёл* 'toe, literally nose of the foot', *ӓви лӓкв* 'door handle, literally circle of the door', *ӓви сӓнт* 'threshold, literally door opening', *иснас хӓл* 'windowsill literally window boat', *мис лӓгланэ-кӓтанэ* 'cow legs, literally cow legs-arms' etc. We no longer consider such words to be metaphors. They lost their imagery and became familiar. The meaning of these words does not appear as figurative, metaphorical.

In order to identify metaphors, we will highlight their main features and characteristics. First of all, metaphor is a concise comparison, has a dual semantic nature. The metaphor is like a riddle, it requires decoding or a solution. Metaphor is a leap from the sphere of language into the sphere of knowledge about extra-linguistic reality. In metaphor, constant and essential characteristics of phenomena are significant.

It is customary to distinguish between the following types of transfers:

1. Physical signs of objects are transferred to a person and characterize his mental properties: *няӓра вӓт* 'burning, strong wind' – *няӓра хум* 'angry, cruel man'; *каминьт сов* 'soft hide' – *каминьт нӓ* 'kind, gentle woman';

2. Characteristics of objects are characteristics of abstract concepts: *вильтэ пут хотльт ёттум* 'his face became like a cauldron (black)', *хӓталэ, сома самагыӓ пӓт хурипа* 'the sun is like a rusty cauldron';

3. The signs or actions of a person are transferred to objects, natural phenomena or to abstract concepts: *аги эргэи* 'girl singing' - *нёрэит янук хольт эргэгийт* 'mountains sing/creak like ice floes', *бйкам кантлы* 'husband is angry' – *вотэ кантлы* 'the wind gets angry/intensifies' ;

4. Signs of nature, natural phenomena are transferred to humans: *салы салаялы* 'lightning flashes' – *самаегтыл салаялы* 'eyes flashing'.

There are several classifications of metaphors in the literature. But basically they are divided into general linguistic metaphors (when one or another metaphorical meaning of a word is widely used and known to all who speak a given language) and individual artistic (created by one person, usually a writer or poet). We have analyzed five collections of Mansi fairy tales, of which about 150 metaphors and metonymy have been recorded.

Analyzing Mansi fairy tales, we have identified metaphors, both general linguistic and artistic. But the frequency of use between them is different - there are more general linguistic metaphors. Let us give examples of the most commonly used metaphors, metaphors of a general linguistic nature: *Тав мўтре, тав номтэ тах элалы минэгийт* 'His wisdom, his thoughts will go further', *Аквнакт улымам, тамле лэтыу, тамле потыр ёхтыс* 'Once, when we were sitting, such a word came to us, such a conversation'; *хот-рохтым, сыме алта палыг покматас* 'My heart almost burst from fright'; *акв сёрнитэ нох мины, акв сёрнитэ ёл вэгли* 'one gold goes up, one gold goes down', as an option, *сёрнияныл ёлалы пэсэгийт*.

It should be noted that in the Mansi language and literature the greatest number of metaphors is associated with somatisms: head, eyes, heart, legs, arms.

According to the classification proposed by N.D. Arutyunova [6], we divided the Mansi metaphors into:

The nominative metaphor consists in replacing one descriptive meaning with another and serves as a source of homonyms: *тўмп нёл* 'cape island', *щайпут нёл* 'teapot spout', *щайпут алы* 'teapot lid', *лэгыл нёл* 'toe, literally nose of the foot', *ави лэкв* 'door handle, literally the circle of the door', *ави сўнт* 'threshold, literally a door opening', *иснас хап* 'windowsill, literally window boat';

A figurative metaphor is a consequence of the transition of an identifying meaning to a predicate one: *посыу сам* 'with good eyesight' – *посыу хотал* 'bright day', *пёлп катуп-лэглуп* 'fast, dexterous' – *пёлп касай, пёлп сэграп* 'sharp knife, sharp axe';

Cognitive metaphors emerge as a result of a shift in the combinability of predicate words and create polysemy: *тёлпыу самыу тарыг ултта*

манрыг хосувлалнувум 'because of a pine tree with a bark of red (lit. bloody) color I wish I would whip (him)'; *Колум нас мирги, акетуп лёмвой хольт, тасавит элумхолас* 'the house is buzzing, like mosquitoes, so many people';

Generalizing metaphor, erase in the lexical meaning of the word, the boundaries between logical orders and stimulating the emergence of logical polysemy:

It is also customary to distinguish by level of belonging in fairy tales. We have highlighted:

- 1) verbal metaphors (predominant amount);
- 2) metaphorized phrases: *полсиу касэв* 'deceitful soroga, meaning "gossip"', *мэсьтыр акань* 'skillful (sewn) doll, meaning "beauty"';
- 3) phrasal metaphors: *нау ман Мёуква, самаген ат нәукег* 'You are like Menkv (forest giant), eyes do not see, meaning "unseeing, blind"', *Тавен, ул Миснэн вәглувес* 'Perhaps Misne (the forest fairy) came down to him, meaning 'lucky, happy'.

We divided verbal metaphors by part of speech and by frequency of use into:

Verb metaphors: *Аквёрт вит лёнтэуукв та патыс* 'And now the water began to sway' (literally, suddenly the water began to chatter); *Таэ ман сүпасэныл, нёлсамасэныл посым та пайтахты, улял та нэгли* 'And from his mouth, from his nostrils, smoke comes out, fire comes out' (literally from his mouth, from his nostrils, smoke is boiled, fire is shown); *пилысьмал та пинвес* 'scared (literally, fear was planted on him)' etc.

Noun metaphors: *Сагыт урыт, сома кәраль ййв хольт люлэгыт* 'The braids of the hills stand like the poles of the corral'. In this example, a double metaphor: *сагыт урыт* (braids of the hills) and *кәраль хольт люлэгыт* (like the poles of the corral); *Нуми мātэ, сома сёрни ярмакыл хартаве* 'The heavens are covered with silk'; *Постыглакетёт, сома вэвта ярмак холы* 'Dawn as if thin silk ends'; In the song-tale, Misne calls an arrow *пāньтя* 'brother-in-law': *Хүрум ура пāньтитэн* 'triangular arrow, literally triangular brother-in-law' etc.

Adjective metaphors: *Хөргыкетёт, сома ярмак тōрыл хосги* 'Burns like a silk handkerchief waving'; *тёлпын самыу тарыг ултта манрыг хосувлалнувум* 'because of a pine tree with red bark I wish I would whip (him)'; *кёр хайтнут* 'iron wolf, meaning unkillable, immortal', *пууңсампа* 'hairy-eyed', *ахвтас сампа* 'stone-eyed', *кёрсампа* 'iron-eyed', meaning tough, burning with fire"; *Тав ам йныг ййв лүпиц сагагум, лүптау ййв хорамың сагагум* 'Like braided rose hips, my two braids, like a deciduous tree, my beautiful two braids' etc.

We also distributed metaphors according to the nature of the attribute, according to the direction of transition of meaning:

Form: *Килп-Нелп-Эква минас, Эква-пыгрисин ань лёнхе сэтан* ‘Kirp-Nolp Ekva walked, now for Ekva the road is a thread’; *Касай элми – люлиң сэй, сәграп элми – люлиң сэй* ‘Sand spit is like a knife-edge, sand spit is like an axe-edge’;

Color: *тёллын самың тарыг ұлтта манрыг хосуваллнувум* ‘because of the pine with red bark, I wish I whipped (him)’;

Size, quantity: *Сяр ләсәл ӯнлахолән. Тыг маныр ёхтым элумхблас – порс* ‘Sit quietly. What is it, a person who came in is garbage (in the meaning of growth, that is, small)’; *әгитә хот-Әссамтавес, сампунә хот сәт тал палытән тәратастә* ‘the girl was embarrassed, her eyelashes lowered for seven years’; *Пур-рр, Пурр-р, сәсагум-әмпагум кәнтыг, пассаг маныгтавен* ‘Pur, pur, my guard dogs, tear it to small pieces (literally, to hats, to mittens)’; *Сүйнил лүпта пәңхвит ёсаңхум* ‘the size of a lingonberry leaf man skiing’;

Sound: *Аквёрт вит лёнтгункв та патыс* ‘And now the water began to sway’ (literally, suddenly the water began to chatter); *Суным талматас, тун айы сунә эргункве та патсыт* ‘and now the sledges began to sing’; *Ййве патум, тәлэ патум хара суй ам палтум та ёхтыс* ‘the sound of a falling tree, the sound of falling pine reached me’;

Property of inanimate objects to animate ones: *Мәнь апситән ос няль сунсы, ләви: «Ам тай сёпыр сяр ат аләгум, нән тахольт та лылың нёвиль тотсын, тыгыл тах сымум пөйты, сөргум тәгиньты»* ‘the younger brother also examines the trap, says: "I didn't get the wood grouse, but you are so good that you brought live meat, with this I will calm my heart, fill my stomach"’;

Property of animate objects to inanimate: *Кантың вотә пөйтыс* ‘The angry wind stopped blowing’. The lexeme *кантың* is only applicable to humans: *кантың хум* ‘angry man’, *кантың нә* ‘angry woman’;

Space, time: *Я, сома вой хольт оваләлы* ‘The river flows like oil’; *Эква-пыгрись лёнхе, сома сэй хольт сўльги* ‘The Ekva-pygris road is pouring in like sand (fast, smooth)’; *Я хольт, тав потре та ови* ‘Like a river, his speech flows’; *Ман нумыл минәгыт, ман ёлыл минәгыт* ‘hey are either from above or from below (i.e. fast)’; *Тав аман нумыл минас, аман ёлыл минас* ‘he either left from above, or left from below (i.e. quickly)’;

Value: *Ань сөрни тәп, мәгың тәп* ‘golden food, honey food’, *нәхыс пити, уйин пити* ‘soft, valuable, warm place’, *Сөрнил масхатым әги ӯнлы* ‘A girl sits dressed in gold’;

Perception (impressions, sensations): *Кйвырыт, симум, сома нәйын*

тэвэ ‘Inside, the heart burns like fire’; *Сам аветуп яңкын сәртаве* ‘Eyes felt as if rubbed with ice’;

Action: *Потыртакетет, сома ёвтыл, нялыл кйвти* ‘He speaks as if he shoots an arrow with a bow’.

In the linguistic structure of the Mansi fairy tale, the metaphor, one might say, occupies a significant place. Linguistic metaphors predominate both in the speech of the characters and in the narrative. Most of the examples under consideration are found in oral folk tales.

The world of the Mansi fairy tale is so rich in wonderful events that it is still embellished by means of expressive and artistic means. Hyperbolization and overestimation (litota) is inherent, characteristic of the Mansi culture. A large number does not touch the narration, but complements, embellishes, makes certain accents on certain objects, phenomena.

Thus, metaphors are used when it is necessary to create expression, to make an emotional impact on the reader, to create some kind of associative phenomenon in the reader or listener. Using metaphors, language and speech is enriched with new phraseological and lexical constructions, helps to notice and identify the main properties of the subject.

Metaphorization is one of the main ways of figurative thinking; and their linguistic results are a reflection of the cultural and mythological worldview.

References

1. Golub I.B. A new guide to the Russian language and practical style. - M.: Eksmo, 2008. 464 P.
2. Stylistic encyclopedic dictionary of the Russian language / ed. M.N. Kozhina. – 2-nd ed., rev. and add. – M: Flinta: Science, 2006. 696 P.
3. Metaphor: URL: <https://ru.wikipedia.org/wiki/%D0%9C%D0%B5%D1%82%D0%B0%D1%84%D0%BE%D1%80%D0%B0>
4. Baranov A.N., Mikhailova O.V., Satarov G.A., Shipova E.A. Political discourse: Methods for analyzing thematic structure and metaphors. - M.: INDEM, 2004. 94 P.
5. Balandin A.N. The language of the Mansi fairy tale. - Leningrad: Glavsevmorput Publishing House, 1939. 78 P.
6. Arutyunova N.D. Metaphor // Linguistics. Big encyclopedic dictionary / Ch. ed. V.N. Yartseva. – 2-nd ed. – Moscow: Great Russian Encyclopedia, 2000. P. 296-297.

DIFFICULTIES IN TEACHING ENGLISH AT THE MULTIDISCIPLINARY COLLEGE

Taburchenko Irina Mickhailovna

Lecturer

Multidisciplinary College

Orel State Agrarian University named after N.V. Parachin

Abstract. *Studying at the Multidisciplinary College students find themselves in special information and an educational environment. Students have a weak level of skills in English.*

A methodological system dictates the choice of the teaching method depending on the learning goals and the conditions. A new trend in English teaching is modern information technologies.

Keywords: *Multidisciplinary college, a weak level of skills in English, the process of teaching, final result of training, choice of the teaching method, learning goals, the achievement of the goals, practical language skills, modern information technologies, the choice and the organization of an educational material.*

Studying at the Multidisciplinary College students find themselves in special information and an educational environment which first of all includes disciplines of a professional orientation. Disciplines of the general humanitarian direction which are included in the curriculum fade into the background. In this regard students have a weak level of skills in English, a low desire to learn a foreign language, as well as a poor knowledge of their native language.

In modern world any specialist in a non-linguistic specialty has to know a foreign language (FL). This requirement is reflected in program documents where a foreign language appears as a federal component of the state educational standard. This should also be reflected in the end result of modern student's education. The level of training of a specialist in terms of skills in a foreign language involves understanding written and oral speech, proficiency in written and oral speech as well as the ability to act effectively in a language environment and this requires a high level of

language, speech and extra-language training.

The process of teaching and the content of a foreign language at the college are influenced by various problems of teaching foreign language to students. Final result of training students also depends on this.

A methodological system dictates the choice of the teaching method depending on the learning goals and the conditions in which the achievement of these goals is expected.

Starting point of any methodological system is the learning objectives and their relevance to the learning conditions. When setting goals, existing conditions must be taken into account so that the achievement of goals is real.

These two fundamental elements of the methodological system determine the choice of the learning method for FL.

Learning goals for FL at the college are dictated by state educational standards and at the performance level is an invariable element of the system.

The goal of the FL course in the system of training college students is the practical language skills as a means of communication in the professional sphere which includes reading literature in the specialty and related fields of science; translation in the specialty and a wide range of socially significant problems; participation in oral communication within the framework of topics and situations of a general nature, determined by the State Standard; practical implementation of linguistic (systemic) knowledge, skills and abilities in a foreign language communication in oral (monologue, dialogue, polylogue, discussion, etc.) and written speech (abstracts, messages, private letter, business letter, biography etc.).

In addition students should have an understanding of everyday life

literary, officially - business, scientific styles; style of fiction; have knowledge of the culture and traditions of the countries of the target language; know the rules of speech etiquette. All these skills and knowledge are provided by grammatical skills, they presuppose a fairly fluent command of the language system at all levels both in receptive and productive modes.

The main conditions affecting the achievement of the goals are the qualitative and quantitative characteristics of the students' contingent; the number of classroom hours allocated for the discipline; the quality of the teacher's professional training, etc.

Other conditions: the level of the material and technical base, equipment with technical training aids, and some others (up to the time of day of the lesson) - can play an important role under the certain circumstances, but do not radically affect the learning outcomes of a foreign language.

Teaching practice demonstrates that the average first-year student is yesterday's high school graduate and he shows a level of a language proficiency that is very far from the requirements put forward.

The average first-year student can not conduct a conversation in English. His vocabulary is minimal and he can not use the available words correctly in a conversation.

At the best the student uses the simplest syntactic constructions while not avoiding grammatical, phonetic or communication mistakes.

The greatest difficulty is the choice of a verb and its use in the desired temporal form. This speaks of the lack of formation in the minds of first-year students of the concept of the English language system in terms of grammatical time.

It is assumed that training in professional communication in English is carried out on the basis of already sufficiently formed language and speech skills and skills with which yesterday's high school graduate comes to college but unfortunately the average college student does not have these abilities.

All this forces the teacher to focus on the compensatory function of teaching the FL, and in other words to correct the shortcomings of school education, "finish teaching", and somewhere retrain students.

Naturally the curriculum does not provide for an additional number of teaching hours for such activities. Shortcomings of educational work, a low level of general culture (a narrow outlook, a low level of reading) also influence on the assessment of the quality of the students' contingent.

In addition to the portrait of an average student there will be a low motivation for mastering FL. This obvious fact looks very paradoxical in modern conditions of the ever-developing process of a global integration, interpenetration and mutual influence of various world cultures. Students are aware of the opportunities that knowledge of a foreign language opens up to them. Career growth as shown by modern sociological studies occupies one of the first places in the ranking of the life aspirations of young people.

But all this for certain reasons and contrary to expectations does not contribute to the formation of an internal motivation of students.

The only real way to increase the motivation of students is to form their interest in classes by methodological means to create an external motivation.

A new trend in teaching English is modern information technologies such as educational computer games, electronic textbooks, and so on.

Such measures definitely allow increasing the interest of students in the process of working on assimilating new information, making the lesson

exciting and slightly increasing its pace.

It is also worth noting that a modern foreign language lesson includes an individual approach to each student. Along with this if the members of the study group speak English at different levels then it is necessary to apply multilevel exercises.

In this connection computer programs are optimal giving out exercises for work with a gradually increasing level of complexity.

In such situation we have to talk about an insufficient number of hours of study load although each college today has the opportunity to increase it both within the curriculum (electives, special courses, elective courses, etc.) and through additional education services (for example courses in the field of professional communication) but the latter is associated with the problems of additional funding which not every student and not every college can afford.

It remains to speak of a standard situation in which an average of two-three hours per week of classroom lessons and about an hour of students' independent work are allocated to a foreign language in a non-specialized educational institution.

The effectiveness of the latter requires a careful and a thoughtful organization. Thus it is obvious that the conditions for teaching FL in terms of the volume of the academic load also do not fully correspond to its goals.

The next components of the methodological system are the selection and organization of educational material. The result of this process is presented in the form of textbooks, guidelines, audio and video materials, computer software, etc. As the result of a review of some existing English textbooks for students shows they are all created for the specific conditions of a particular educational institution and these conditions differ from college to college, from region to region.

Consequently textbooks also differ. They differ in complexity, in the hierarchy of learning objectives, in the organization of educational material, in the way it is presented, etc.

But since there are much fewer textbooks than educational institutions, each of which has its own learning conditions, the teachers of foreign language have to either write their own textbooks or to adapt the existing ones for specific conditions.

It seems optimal to have such an educational-methodical complex or work program that in terms of content would differ in different levels of complexity of the educational material and would suggest a greater variety of techniques for mastering it and speech skills.

All of the above allows us to conclude that the real process of teaching

foreign language in general and professional foreign language discourse in particular in a non-linguistic educational institution has significant systemic shortcomings that are in its main elements it does not meet the requirements of the methodological system.

The main disadvantage is the inconsistency of the goals and conditions of teaching and the teacher's ability to influence the structure and content of these subsystems is minimized due to their essential features and objectively specified nature. The teacher is also given the content of the educational material and its organization. But in this respect the teacher is freer although he is limited by the material of a specific educational and methodological complex or work program.

References

1. Klychnikova B. I. Psychological features of teaching reading in a foreign language. - Moscow: Prosveshchenie, 2003. - 224 p.
2. Miloradov S. A. Some problems of teaching English in high school / / Concept. -2014. - No04 (April).- ART14097. -0.4 PP. - URL: <http://ekoncept.ru/2014/14097.htm>. - State. reg.
3. Rakhmanov I. V. teaching oral speech in a foreign language. - Moscow: Higher school, 2002. - P. 120-122.
4. N. Y. Nikulina, T. A. Zinovieva, Belgorod state national research University, Belgorod, Russia
5. BIM I. L. Some actual problems of modern teaching of foreign languages // IYASH. 2001-4. - P. 5-7.

DOI 10.34660/INF.2020.88.61.015

**STATE LIBRARY INSTITUTE – UNIVERSITY OF LIBRARY STUDIES
AND INFORMATION TECHNOLOGIES: DEPARTMENT OF
LIBRARY STUDIES AND BIBLIOGRAPHY (GENEALOGY OF THE
MONOGRAPHIC REFERENCE-INFORMATION CLUSTER
FOR 90 YEARS: 1930-2019 – CARCASS FOR TRANSFORMATION OF
A TRADITIONAL RESOURCE INTO A DIGITAL ONE)**

Denchev Stoyan Georgiev

Doctor of Economic Sciences, Professor
University of Library Studies and Information Technology
Bulgaria

Kumanova Alexandra Venkova

Doctor of Pedagogical Sciences, Professor
University of Library Studies and Information Technology
Bulgaria

Kazanski Nikola Rachev

Associate Professor
Central Library of the Bulgarian Academy of Sciences
Bulgaria

Abstract. *The subject of the study is the monographic production with reference-information importance by the professors in this institution and the scholars of the informatization. Through the rhizomatic methodology of modeling is achieved the goal of the study – to be synthesized a genealogy of production of 270 titles by the academics of SLI – ULSIT – the first specialized training research units in the library-information education in Bulgaria, consolidating the national bibliosphere in conformity with the universal one, – and standing near by them (coauthors, editors, reviewers) in the whole chronotope 1950-2019 (1st ed. – 1930), related to the cluster of the Department of Library Studies and Bibliography (during the years other names) and its subsidiaries.*

The submitted information model is presented in this study as a historical carcass for transformation of a traditional resources into a digital one.

Keywords: *SLI – ULSIT, Department of Library Studies and Bibliography, bio-bibliography, monographic reference-information production, bibliometry, scientometry, digitization, humanitarian dimensions.*

Introduction

The Department of Library Studies and Bibliography (former: Bibliography – 1979-1992, Bibliography and Scientific Information – 1992-1997, Library Studies – 1968-1997, Library Studies and Bibliography – 1998-2008; 2019- , Library Sciences – 2008-2018) at the **University of Library Studies and Information Technologies – ULSIT is the first specialized training research unit in the library-information instruction in Bulgaria.** Newly created on **1 November 1950 State Library Institute – SLI** (former: Institute of Librarianship – 1989-1992, College of Librarianship – 1993-1997, College of Library Studies and Information Technologies – 1998-2003, Specialized College of Library Studies and Information Technologies – 2004-2009, **ULSIT** – 2010-), invited T. Borov (1901-1993) for part-time lecturer in specialized subjects. Five and half decades will be needed to the social mind to become possible in 2004 for the architect of the postnonclassical information environment Stoyan Denchev to stand up, realize and SLI as Higher school and in 2010 as an University – ULSIT.

Five years after the creation of SLI was established a Department at SU (*today*: Library Studies, Scientific Information and Cultural Policy – LS-SICP) on the initiative of T. Borov which subsists as a particular subject only two years and recovered its detachment only after 40 years... It was closed down an emblematic Bulgarian Bibliographic Institute (BBI)...

Methodology

The monograph reference-information production of the professors of SLI – ULSIT, as well as their coauthors, editors and reviewers, in an object of biobibliography through rhizomatic methodology of the whole chronotope for 1950-2019 in order to achieve the goal – to synthesize the genealogy of the works.

Results

SLI and its main department laid the **foundations of the library and bibliographic profession in Bulgaria.** T. Borov revealed in the mass the character of the **library science as an AUXILIARY** and evolving from this ontology a qualimetry of the library-information training: a symbiosis of science-practice are in the ground of the platform of SLI where taught the best specialists, not only in the respective subjects, but also in the country as well. This is reproduced with more strength after 2002 by the successor of SLI – ULSIT.

Namely the Department of Library Studies and Bibliography – in sync with the other department of ULSIT – it became a base for **approbation**

and introduction of the most modern methods of training and research in the bibliosphere at world level. Here are realized innovative platform as the **Laboratory of library technologies (LibLab)**, *Bulgarian cities in the national Revival, Author's rights policy in the library and cultural institutions. In two topoi* (Sofia; Saint Petersburg) was edited the first and only general work *Introduction in the Humanitarian Bibliography...*

Among the scholars in the Department and its subsidiaries are personalities, specialized and even with doctor's degrees from the most reputed library academic institutions abroad, in which they are professors up to now – for instance: historiographer and specialist in European literature **Assoc. Prof. Dr. Elena Naerlich-Slateva – the Friedrich-Schiller University of Jena.**

In SLI is a situation in which matured the NECESSITY TO UNIFY AND PROMOTE IN ONE EDUCATIONAL INSTITUTION the complex training research-theoretical and practical-applied instruction of specialists in library-information activity. The architects of SLI – ULSIT – AUTHORS of the first general monographic works with reference-bibliographic wealth of the syntagm of the differentiated knowledge are persons graduated in Bulgaria, but specialized abroad (Italy, Germany, Russia...), who became teachers in the institute and are related practically and intellectually to BBI, NLCM, CL BAS, SU... – Ts. Tsvetanov, M. Vasilev, B. Desev, D. Karshovska, D. Gancheva-Bozhinova, V. Mladenova... (by birth and year of publ.). Such are those preparing interdisciplinary synthesis of the branch library-bibliographic knowledge – T. Arabadzhieva, S. Krlev, G. Draganov, T. Boncheva.

Conclusions

The persons in focus should be rationalized comparatively from a historiographic approach in a set of their monographic works:

- librarian, bibliographer and book specialist **TSENKO TSVETANOV** (1904-1960), teacher in SLI in **general librarianship and history of bibliography** (1951-1960), director of SLI (1953-1960) – graduated in pedagogics from SU (1929), teacher in Vidin region (1922-1926) and Sofia (1929-1939), man of letters – children writer, translator, employee at the Ministry of national education, information and arts, director of publishing house *Public education*, senior curator in BBI (1948-1953), compiler of *Annual of BBI* (T. 2: 1947-1951. – 1953) and editor of *Bulgarian books*. work: *Bulgarian bibliography. History and contemporary state* (1955; 2. ed. 1957) (manual for – here and further below: m/SLI); *Materials on the his-*

tory of Bulgarian bibliography before the Liberation / BBI ; ed. T. Borov (1955); *Bulgarian book after Nine September. Statistical analysis* (1952); *School and children libraries* (1930); *Children libraries* (1953; 2. ed. 1960) (m/SLI); *General librarianship* / coauth.: E. Kirova (1956) (m/SLI); *Uniform rules for description of printed works in public libraries* / coauth.: D. Gancheva-Bozhinova, L. Albanska (1951; 2. ed. 1953; 3. enl. and rev. ed. 1961) (m/SLI); *Tables of the Decimal classification for public libraries* / coauth.: D. Ikonomova (1951; 2. rev. and enl. ed. 1955; 3. rev. ed. 1960); *Authors tables* / ed. ... (1952; 2. rev. ed. 1954); *Compendium of library technics* / comp.: ..., H. Bycce (1951; 2. ed. 1953);

- **historian of the book, writing and polygraphy MARIN VASILEV** (1907-1983), teacher in SLI in **book science** (1950-1970) and author of the first Bulgarian manuals in this field, laid the foundations of the subject, graduated from the School of typography and graphics at the State printing office (1928) and in Free university (today: University of national and world economy) (1933), head of workshop in the State printing office (1928-1948), teacher in the Polygraphic nightschool (1935-1944), in the Polygraphic vocational school (1945-1950) and in SU (1956-1971), director of *Polografizdat* (1948-1950), deputy director of the Administration of publishers, polygraphic industry and book distribution(1950-1965), creator of the first and only polygraphic journal *Poligrafia* (1949): *work: History and technique of the book* (1955) (m/SLI); *General and applied book science* ([2. rev. ed.] 1963; [3.] enl. ed. 1970. – In book: 2. ed.) (m/SLI); *Book science* / coauth.: B. Vatrachki (1971);

- **bibliographer – historian and critic of the bibliography, theoretician of the bibliophily, librarian BORIS DESEV** (1910-1979), teacher in SLI in **general bibliography, reference-bibliographic activity and work with readers** (1951-1979), head of Department of bibliography (1964-1979), graduated from First men highschool in Sofia (1929) and Slavonic philology in SU (1936), librarian in the Sofia city library (1939-1941), founder of the school libraries in Sofia municipality (1942-1943), librarian of the Military musical company (1949-1950); creator of the unique **chrestomathy of the Bulgarian general bibliography** (1976): *work: Chrestomathy of the Bulgarian general bibliography... Before Liberation* (1976) (m/SLI); *Reference-bibliographic works* (1960) (m/SLI); *Forms and methods of the work with reader in the library* (1956) (m/SLI); *Practical guide of political posters in the library* (1955; 2. rev. и enl. ed. 1965) (m/SLI);

- **librarian DORA KARSHOVSKA** (1917-1997), teacher at SLI in **library catalogs** (1951-1972), graduated from the First girls' highschool in Sofia (1936), French philology in SU (1941), teacher in French in Tsaribrod

(1942-1944) and in Bregovo, (1945-1947); annual course in librarianship (1948), bibliographer in National library; librarian in SLI (1950), manager of the qualification of librarians in school libraries, methodical assistance in the building of catalogs in country's libraries; carried out particular **methodology for classification of documents**; assistant in library journal *Bibliotekar. work: Library catalogs* (1955; 2. rev. ed. 1961; 3. enl. и rev. ed. 1965; 4. rev. ed. 1970) (m/SLI); *Handbook for country library* / coauth.: E. Kirova, S. Shiklev (1954);

- **bibliographer and librarian DORA GANCHEVA-BOZHINOVA** (1920-1999), teacher at DLI in **acquisitions and organization of library collections** (1950-1968), graduated from the American college in Lovech (1938), in history of art and library studies from the University of Florence – Italy (1938-1943); bibliographer in the National library in Sofia (1945), assistant in BBI (1946-1949); translated the work of American theologian, librarian and bibliographer Ernest Cushing Richardson *Classification: theoretical and practical* (1947): *work: Acquisitions and organization of library collections* (1956); *Library organization. Methodical activity* (1956); *Uniform rules for description of printed works in public libraries* / coauth.: L. Albanska, Ts. Tsvetanov (1951; 2. ed. 1953; 3. enl. and rev. ed. 1961) (m/SLI) (first Bulg. In this field); *Dr. Nikola Mihov : Biobibliography* / coauth.: B. Bozhinova-Troyanova (Annual BBI, 1, 1948); *Bibliography of Bulgarian librarianship and Bulgarian bibliography : September 1944 – December 1946* / coauth.: N. Nikolaev ; general ed. B. Bozhinova-Troyanova (Год. ББИ, 1, 1948, с. 655-680);

- **librarian and bibliographer VASILKA MLADENOVA** (1921-1994), teacher at SLI in **library collections and catalogs** (1961-1981), graduated from First girls' highschool in Sofia (1939), Slavonic philology in SU (1948) and training course for librarian – university graduates (1949); bibliographer and methodologist in the National library in Sofia (1949-1961); introducing **the term reacquisition**: *work: Library collections* (1976) (m/SLI); *Catalogs – medium for propaganda of the best books in libraries* (1954);

- **librarian and bibliographer TODORKA ARABADZHIEVA** (1926-2017), teacher at SLI in **special bibliography (bibliography of natural sciences /theoretical and applied/)** (1967-1983), engineer-forester, graduated from Forestry faculty at SU (1949); teacher in forestry at the Vocational school in Sofia (1951-1953); specialized in library studies and bibliography in SLI (1954), Saint Petersburg Institute of Culture – Russia (1967), *German National Library in Frankfurt* and Cologne public library of (1972); **participates in the introduction and realization of the**

differentiated information service of specialists as bibliographer in Department of processing (1954-1956), methodologist in Department of scientific methodology (1956-1961), librarian in Specialized reading room of medical, natural and applied sciences at National library (1961-1967);

- **librarian and bibliographer PENKA MITRANI (1926-)**, teacher at SLI in **reference-bibliographic activity (1973-1981)**, graduated in stomatology from Stomatological faculty (SF) of Medical academy (MA) in Sofia (1950) and library studies and bibliography from SLI (1954), **chief librarian of the SF at MA (1950-1973)**, defended a thesis in medicine on stomatological researches in Bulgaria, published *1870-1970 (1973)*, creator of the **branch universal model of the homonymous subject** (comp. and: Sect. *Medicine in Tables of Decimal classification /1985/*): *work: Reference-bibliographic and information activity in the library (1982)* (m/SLI);

- **bibliographer and librarian STEFAN KRALEV (1927-1989)**, teacher at SLI in **special bibliography (bibliography of social sciences)**, graduated in library studies and bibliography from SLI (1955) and Saint Petersburg Institute of Culture – Russia (1970), **methodologist** in Regional administration of libraries in Sofia (1955-1959) and in Department of libraries at Committee of art and culture (*today: Ministry of culture /1959-1973/*), head of Department of bibliography and deputy-director of SLI (1979-1987); approbated a **source approach to the bibliographic information**: *work: Journal "Librarian" : Subject index. 1953-1983" / comp. N. Shumanova ; ed. S. Krlev (1989)*;

- **librarian and bibliographer, specialist in work with readers BOGOMIL PAUNOV (1927-2002)**, teacher at SLI in **work with readers (1967-1988)**, head of Department of library studies at SLI (1968-1978), graduated in legal and social sciences from SU (1953) and in library studies (training course for librarians-university graduates at Ministry of culture /1954/), librarian in Reference department and methodologist in Methodological department at National library in Sofia (1962-1967), observed the **behaviour of the reader–specialist in information environment (Nat Lib)**, awarded with orders *100 years National library, St St Cyril and Methodius*, title *Honored teacher*. *work: Principles of the work with readers in general education libraries (1976)* (m/SLI); *Audiovisual media in libraries / comp. Stoil A. Ganev (1985)* (y/SLI);

- **bibliographer of the modern literature in social sciences and analyst of the bibliography in natural sciences GANCHO DRAGANOV (1929-2011)**, teacher at SLI in **special bibliography of natural and applied sciences**, head of Department of bibliography (1987-1992), gradu-

ated in philosophy from SU, realized **one of the first bibliometric and scientometric study of the literature in library studies and bibliography;**

- librarian and historian of the libraries TEMENUZHKA BONCHEVA (1934-), teacher at SLI in **general library studies and history of libraries** (1970-1990), graduated in general history from SU (1961),

To the related to the cluster of the actual Department of library studies and bibliography belongs the **authorship** of the appeared **during 90 years: 1930-2019 270 BOOKS** in library-information field with reference trend. **30** of them are from the syntagm of the **DIFFERENTIATED knowledge of the postnonclassical paradigm, transforming through the cited works in a syntagm of INTERDISCIPLINARY.**

The structured here bibliographic and historiographic information model is a supporting construction for positioning of the transformations in the building of a digital resource encompassing all specificities of a traditional one.

References

1. Denchev, S., A. Kumanova. PARADIGMA INFINITAS. // Katedra bibliotekoznanie i bibliografia : Almanah. София, 2020, p. 355-538. (in Bulg.) [Денчев, С., А. Куманова. PARADIGMA INFINITAS. // Катедра библиотекознание и библиография : Алманах. София, 2020, с. 355-538.]

**MENTAL METAPHYSICAL ENTITY OF THE SCIENCE – PRACTICE –
EDUCATION IN THE LIBRARY-INFORMATION SPHERE
(POSTNONCLASSICAL PARADIGM AND DISTINCTION: A STRATEGY
FOR DIGITAL TRANSFORMATIONS)**

Kumanova Alexandra Venkova

Doctor of Pedagogical Sciences, Professor
University of Library Studies and Information Technology
Bulgaria

Kazanski Nikola Rachev

Associate Professor
Central Library of the Bulgarian Academy of Sciences
Bulgaria

Vasilev Nikolay Kurtev

PhD of the theory of scientific information, Associate Professor
University of Library Studies and Information Technologies
Bulgaria

Abstract. *Through a retrospective multilevel guide of the world universal bibliography (1902-) the cultural globalization in the biblio-info-noosphere, preceded by an information blast and information market in the 1940s, seen in the focal point of the genre – triunity: goal – addressee – selection as relativistic system reticular method for generating of global (universally significant) bibliographic pictures of the material and ideal orders of modeling. The library-information universe (science – practice – education) is the subject of the study. Through the methodology of the library comparativistics is achieved the goal of the study – to reveal as a geocosmic diversity of the globality the holistic inventions of trivium: library-bibliography-book science in a triad: addressee – library – document by the rudiments of the cognitive cluster.*

This study presents a practical methodological key to a strategy for digital transformations of the relation science – practice – training.

Keywords: *multilevel universal bibliographic guide, goal – addressee – selection, library-bibliography-book science, addressee – library – document, material – ideal orders of modeling*

Dedicated to the 70th anniversary of the University of Library Studies and Information Technologies – successor to the State Library Institute

Introduction

Diverse multilevel retrospective guides of the world (international) universal bibliography to the 1940s of 20 c. – a start of the information blast in the world and the eve of the publication in 1942 of *A Road to the Books* by T. Borov show the chronotope of the genre as a planetary phenomenon: USA (1902-) – Germany (1905-) – UK (1905-) – Czech Republic (1919-) – Poland (1925-) – Italy (1930-) – Japan (1930-) – France (1936-) – Russia (1940-) – Bulgaria (1942-)...

The presented toponymy:

- indicates the countries with high level of development of the bibliography and of the bibliography of second and third degree (which with *Road to the books* by T. Borov Bulgaria became humanitarian commensurable);

- determines the schools of epistemological (universal, philosophical, humanitarian, bibliographic) knowledge – national and world centres;

- designates the genesis of the tradition – the term should be a scientific-practical movement for secondary-documental treatment of the information environment of the planet as a system multidimensional multilevel semiologic entity: biblio-info-noosphere. The phenomenology of the generated in the universal international retrospective bibliography of the bibliography guide of 20th c. is a result of the initially comparative bibliographic cognitology which is *conditio sine qua non* and *modus vivendi* – of trivium: library- bibliography-book science. The biblio-info-noosphere in the guide concerned is observed in systematic orders:

- principal diversity, reflecting many levels (factographic, primary- and secondary-documental, metasystematic, philosophical) of modeling;

- indicating (naming) of this diversity is realized through contextual synonymy of n-denominations (universal, world, international ... bibliography);

- this diversity is generated from the triunity: goal – addressee – selection – relativistic cultural-information systematic secondary-documental reticular (network) method for affording global (universally important) systematic bibliographic pictures of the information realities.

The triunity: goal – addressee – selection: SCREEN (term by T. Borov) of the international retrospective bibliography of second and third degree cultural-phenomenological advises (1902-) the globalization of the world and creates its information model as a universal polyphony, observed from the centres of the library-bibliographic-book science.

Methodology

Trough a draft of the notable works from modern times is tagged for reference-information goals the outline of the LIBRARY-BIBLIOGRAPHIC SCHOOLS in the knowledge cluster of trivium: library- bibliography-book science as a moment of philosophical-information picture of the biblio-info- noosphere in which originate postnonclassical humanitarian knowledge and humanitarian bibliography. Historiographically and cognitologic-rhizomatic seen, any of the elements of trivium: library-bibliographic-book science by itself is a cluster. Library-information universe (science – practice – training) is a subject of the study. Through the methodology of library comparativistics is achieved the goal of the study – to be revealed as a geocosmic diversity of the unity of holistic inventions of trivium: library-bibliographic-book science in a triade: addressee – library – document in the rudiments of the knowledge cluster.

Results

The differentiated knowledge from the Enlightenment and its library-information scientific theoretical-practical complex is divided into various approaches and subjective views between principally polyvariant concepts for OBJECT and SUBJECT – according to what is subordinated (term: T. Borov): library studies, bibliography, book science, polygraphy, archivistics, palaeography, documentalistics, informatics, information technologies...

This complex is designated by forms of trivium: library-bibliographic-book science which in the terms of an information blast are integrated and transformed in an interdisciplinary conglomerate:

- 1) UBIQUITY (with different intensity) geographical dissemination (it is no more prerogative of different countries);
- 2) ELECTRONIZATION (inserting in the information industry and subordination to the information market);
- 3) REALIZATION of the library society as a unity of the global process of informatization and international consolidation of the forces.

The classical concepts of MATERIAL ground of the objects of any of the elements of trivium: library-bibliographic-book science and their subjects (library, bibliography, book/document) are valid for a part of the specialists even today, but in trivium and in each of its elements PARADIGMATICALLY penetrates the nonclassical concept of the IDEAL as an architect of the material.

The arc of the postnonclassical trivium: library-bibliographic-book science is introduced in a historiographic and cognitive context through emblematic innovation works (with emphasize on Bulgarian exterioric) [1-3].

In it the system BINARY OBJECT: BOOK/DOCUMENT – READER is naturally TRIPLE SUBJECTIVIZED and in library studies – through book science – by introduction in its semantic chain of the phenomenon LIBRARY (!): BOOK/DOCUMENT – LIBRARY – READER, in the bibliography – through library studies by introduction of the phenomenon BIBLIOGRAPHY (!): BOOK/DOCUMENT – BIBLIOGRAPHY – READER

The presentation naturally does not necessitate the library studies [1] and bibliography [2] to receive here detailed rescription of their postmodern hypostasis because the phenomenon LIBRARY and phenomenon BIBLIOGRAPHY are SOCIALLY structured and bear their intrinsic for all times universal humanitarian image of the society, to whom belong: the first (LIBRARY) – to a greater extent; the second (BIBLIOGRAPHY) – to a lesser extent (in a ontological respect the second phenomenon is not only institutional cause but above all – a CREDO of particular persons).

For the last affirmation attested the whole history of the bibliography (comp.: the unique case: acad. Nikola Mihov /1877-1962/ – the greatest Bulgarian bibliographer and encyclopedist ever – declines the office Director of the National Library and quits the position of Director of the Library of Bulgarian Academy of Sciences, in order to devote him to the creation of the foundations of the Bulgarian bibliographic exterioric).

Namely the presence of a bibliographic exterioric in particular countries is a decisive precondition for them in the beginning of 20 c. to appear the first universal multilevel bibliographic guides to literature. For Bulgaria the line bibliographic exterioric – universal retrospective international bibliography is: N. Mihov /1915-1935/ – T. Borov /1942/).

In a very different way is the problem with OBJECT: BOOK/DOCUMENT – READER in the bookscience [3],

In which the subjectivization in the postmodern philosophical-information paradigm realized through the SECOND SIGNALLING SYSTEM OF MAN, and this phenomenon is GEOCOSMIC (given in the phylogenese) and drops out the sociological concepts, typical for the traditional classical thinking (books/documents are as many as their perusals).

Conclusions

The epistemology of an introduced in historiographic [4] and cognitologic [5] context of the postmodern reality of the biblio-info-noosphere COGNITIVE CLUSTER of trivium: library-bibliography-book science with its intrinsic internal differentiation of the crossing vortices (library science, bibliography, book science, polygraphy, archivistics, palaeography, documentalistics, informatics, information technologies...) structures the sys-

tem semiologic coherence of the phenomena and their correlation: philosophical-information picture [6].

The epistemology focuses on the biblio-info-noosphere generating IMPERATIVE OF PHENOMENOLOGICAL EMPIRIC SUBJECTIONS of the informatization – triad: ADDRESSEE (A) – LIBRARY (L) – DOCUMENT (D).

We consciously are focusing our attention on the ADDRESSEE (the recipient of the information – Ger.: Adressat), perceived in a system globality of the universal bibliographic phenomenology: GOAL – ADDRESSEE – SELECTION (and not on the RECIPIENT /Lat.: recipient, recipientis – receiver of the information: perceiving EXTERNAL impacts – signals).

The addressee of information is to the letter also its recipient but his function of ADDRESSEE makes him SYSTEM ACTIVELY OPERATIVE INTERNAL (!) FORCE – a decisive component of the global bibliographic modeling: GOAL – ADDRESSEE – SELECTION. In this modeling the addressee is included with its MENTAL necessity of professionally structured bibliographic information which form is not only positioning secondary-documental reverberation of the existing documental stream, but also programming, and prognostic effectively creative STAY of the ADDRESSEE in the biblio-info-noosphere. Thereby the addressee participates in the informatization with its MENTALITY (studied and familiarized BY BIBLIOGRAPHER as a necessity of information for the ADDRESSEE).

The correlation goal – ADDRESSEE – selection has three functions:

1) modeling – not only the bibliography is modeling the addressee, but also it makes the same – and the goal, and its selection (bibliography exists not only to reflect secondary-documental the knowledge, but also TO GIVE IT TO THE ADDRESSEE);

2) programming – the bibliography not only reflects documental realm, but it is also a PROGRAM – INFORMATION MAP (ATLAS) FOR ADOPTION BY THE ADDRESSEE;

3) prognosting – the bibliography not only generalize the trunc roads of the knowledge, but also of its HISTORIOGRAPHIC base which makes possible the prognosticating of NEW PATHS and TRUNC ROADS which are generated not only in the BIBLIOGRAPHER'S MIND but also in the ADDRESSEE'S MIND.

Lapidary: the presented structure is synthesized on the following grounds.

1. Triad: addressee of information (A) – library (L) – document (D) is a MENTAL FORMATION, born from the ONTOLOGIC CHAIN of dependencies of its elements.

2. Addressee (A) of information – “reader” of document (who realizes himself as “vital” indigent in this document: to read it, to give it to other people (or vice versa, etc.), because the document is correlated through the second signaling system by individual way with his memory, – ONESELF became aware as ADDRESSEE, and ONESELF defines and position the sense of interrelations in the information reality – ideal and material, and intelligibly encompasses it through his mentality in the arsenal of his lores (actions).

3. Library (L) – except the classical type (with alphabetic, subject and systematic configuration of traditional and electronic information resources, reflecting facts, documents, metasystems, philosophical pictures), – in a postmodern nonclassical reality rises to us and between us in an image of an electronic (digital, virtual, cyberphysical, smart) [7-10], created and disseminated not by the classic library, and we enter it (virtually – through the technologies, but by the mentality) as one enter the real world with ideal nature, and to enter it, and to take from it we could only BY OURSELVES (E. I. Ryorih).

4. The document (D) – material or electronic (digital, virtual), which by itself is a form (primary- or secondary-documental) of the reflected diversity of the world (physical, biological, cultural) – resuscitates through the meaning of its (of the document) message/messages which (the sense) cosmogonically presupposes n-views (perusals) depending of the individual memory and sensuousness of the recipient.

The originated from the phenomenological spectrum of the ADDRESSEE of the information (A) swirling of the LIBRARY (L) and DOCUMENT (D) (which also swirled the ADDRESSEE of the information) is rationalized in a specific way by the BOOK SCIENCE with the originated in it READER SCIENCE.

Here take part: and LIBRARY STUDIES: (L), and BIBLIOGRAPHY: (B). And the very trivium: library-bibliography-book science – similar to various other system plural variant configurations of the human mentality (activity) – creates, disseminates, enlarges the described swirling through the cognitive cluster: library science, bibliography, book science, polygraphy, archivistics, palaeography, documentalistics, informatics, information technologies... This cluster is a form of enlargement of the trivium: library-bibliography-book science.

The universal biblio-info-nooshere also has n-denominations because it is a fruit of the REASON and MENTALITY (most human!) OF THE MAN, and we – people – are living in a psychocivilization (S. Lem): psychoshere – mnemoshere – gnoseosphere.

For treatment of the problems of the interrelations between the ideal (invisible ontology) and the real in the information modeling is perspective the study of the experience of the created in honor of Michael Polanyi Center (MPC) at Baylor University, Texas.

It is the first research university center dedicated to the principle of reasonable conception. Founded in 1999 with main goal – to develop the concept of science in a religious aspect [11]. In this respect is quite interesting the similar activity of the University of Pasadena and Princeton University [12]...

The genial German physicist-theoretician, philosopher, Nobel laureate Albert Einstein (1879-1955), before being assessed as the best academic of modern time, has the opportunity to travel by bicycle from Switzerland to Italy – when passing near the fairy castles and Benedictine monasteries (he was born in a Catholic family) has recalled about ANCIENT TALES and LEGENDS which suggested him the IDEA of the THEORY of RELATIVITY. It is quite emblematic that Hong Tsi-chen delivered the contextual message of this theory four centuries before Einstein: The dimensions of the space – are contingent on our mind. It is curious that the root of this reasoning is in one of the ancient sacred book of the Mankind: Indeed the memory is larger than the space – Upanishads (transl. A.K.).

Perceived in a context of the term long time (M. Bahtin) in conformity with the human intransient values in the constantly changing world: freedom, democracy [13] (M. Gorman), library-information universe of the science – practice – education is reflection of the geocosmic diversity and is an organic part of the natural holistic way to build (reverberate) constantly constructing harmonic universal information environment of the biblio-info-nosphere.

Through the constructed by the human mentality principally eternal rhizome (absent structure of the information – U. Eco) is metaphysically restored the lost globality in the universal knowledge which is not paraspace [14]. It is a humanitarian dimension of the postnonclassical time-space – paradigmatic nonclassical imperative for correlation of discrepancies, structured and structuring in the recesses of the rhizome obscure (philosophically rationalized) ontology of the informatization [15].

Essentially through the structuring of the absent rhizomatic reference-information carcass of establishing relations among things is created a methodologic key for sustainable strategy for digital transformations of the relation science – practice – training.

References

1. S. Denchev, A. Kumanova. "Simfonia za obshtestvoto na znanieto". // Liderstvoto v biblioteknia menidzhment. Sofia, p. 319-330, 2018.
2. A. Kumanova, N. Kazanski, N. Vasilev. "PARADIGMA TERTIUM (Bibliografskiat ezik – sinergia : Novo znanie za kvintesentsiata na tsivilizatsiata : Intelligentnite sistemi – postmoderni magistrali na filisofskoto relevantno znanie na Zapadnoevropeyskata, Germanskata, Anglo-amerikanskata r Frensko-kanadskata shkoli na informatizatsiata" // Informationsen Byuletin na Tsentralnata Biblioteka na BAN (Sofia), N 11-12 (126), p. 7-17, 2019.
3. A. Kumanova. "HOMO LEGENS : Cheteneto v svetlinata na humanitarnoto postneklasichsko poznanie". // Mukanova, P. Istoria i teoria na cheteneto. Sofia, p. 158-201, 2018.
4. R. Spalding, Chr. Parker. Historiography. Manchester : Manchester Univ. Press, 2008.
5. M.T. Gilderhus. History and historians. New York : Prentice Hall, 2000.
6. Eugene Wigner's speech at the Nobel Banquet in Stockholm, December 10, 1963.
// <<https://www.nobelprize.org/prizes/physics/1963/wigner/speech/>>. 22.01.2020.
7. B.W. Cull. "Reading revolutions : Online digital text and implications for reading in academy". // First Monday, Vol. 16, N 6, 6 June 2011. <<http://firstmonday.org/ojs/index.php/fm/article/view/3340/2985>>. 23.01.2020.
8. R. Fox. "Digital libraries : The systems analysis perspective machine erudition". // Digital Library Perspectives, Vol. 32, Issue 2, 2016. <www.emeraldinsight.com/>.
9. B. Lush. "Managing Accessible Library Web Content". // Advances in Librarianship, Vol. 40, 2015. <www.emeraldinsight.com/>.
10. D.H. Ziegenfuss. "Opening up collaboration and partnership possibilities : Re-valuing library resources, skill sets, and expertise". // Digital Library Perspectives, Vol. 32, N 2, 2016. <www.emeraldinsight.com/>.
11. Discovery Institute, Seattle, Washington. // <<https://www.discovery.org/about/>>. 23.01.2020.
12. The Nature of Nature : Examining the role of Naturalism in Science. Wilmington, DE : Intercollegiate Studies Inst., 2011.
13. M. Gorman. Our enduring values revisited : Librarianship in an ever-changing world. Chicago ; London : American Library Association, 2015.
14. B. MacHale. POSTcyberMODERNpunkISM, in storming the reality studio. Duke : Univ. press, 1996.
15. M. Epstein. "The Role of The Humanities in Global Culture : Questions and Hypotheses". // Rhizomes : Cultural Studies in Emerging Knowledge, N 2, 2001. <<http://www.rhizomes.net/issue2/epstein.html>>

PHILOSOPHY OF TECHNOLOGY IN TECHNOGENIC SOCIETY

Popkova Natalia Vladimirovna

Doctor of Philosophical Sciences, Full Professor
Bryansk State Technical University

Abstract. *The article examines the main social functions of the philosophy of technology in a technogenic society. It is shown that it is precisely the philosophy of technology that answers topical issues of our time that is capable of returning public attention to philosophy and contributing to the main task of our time - the humanization of technical progress.*

Keywords: *philosophy, technology, modernity, social functions, technogenic society.*

Modern society - a society that took shape by the end of the XX century in the most technologically advanced countries - is called technogenic. Technologies not only penetrate and support the life of almost every inhabitant of the Earth: in accordance with scientific and technological progress, social relations of people, their worldview and cultural norms are changing. The technosphere, created by the totality of material means of the transformative activity of mankind, has acquired systemic characteristics - the structure and rhythms of functioning. Insufficient controllability of technical reality is noted: incomplete forecasting of the consequences of introducing technical innovations; the need for socio-cultural support for the implementation of technological processes leading to social change; the presence of negative results of technical activities (environmental and logical problem, etc.). Technogenic determination of various spheres of individual and social life is manifested in a wide range: unconscious motives and attitudes of activity generated by the dominant technical rationality, stereotypes of behavior, mechanisms of perception and assessment of reality, values, attitudes. Although technical objects are passive products of technological replication, the technosphere as a whole is increasing its independence from human goal-setting. A person discovered that he himself loses his subjective qualities, acting functionally not so much as a source of new practices, but as an instrument for their implementation. The autonomization of other human creations (linguistic environment, so-

ciality, value systems, etc.) shows that the mismatch between the goals and consequences of activities is of a global nature. The classical concept of an active subject, organizing his environment in the form of coherent structures, disintegrates. So, new technologies are changing cultural values and norms. Technological, instrumental installation is used not only in relation to nature, but also to man; moreover, a person uses it even in relation to himself, to his physical and mental qualities. In the worldview of a technogenic society, according to V.M. Rozin, the initial prerequisite is the conviction that technology allows "to solve the main civilizational problems and tasks, not excluding those generated by the technology itself"; therefore, "all the main spheres of human activity are technically interpreted: science ... education, the institution of power" [10, p.131].

So, how can philosophy be "technically interpreted"? Most philosophers diagnose its state of crisis and call, according to I.T. Kasavin, to analyze its position "in the techno-scientific world, in which... philosophy has to adapt to a world that does not demonstrate an explicit need for it" [4, p.9]. The reason for this crisis is the discrepancy between the basic principles of philosophical discourse and the prevailing technical rationality, which evaluates everything based on the criterion of utility [9], understood purely utilitarian - in the form of practical benefits, raising the standard of living. Philosophy is required to prove its right to public attention and government support, pointing out the social functions it performs, that is, its usefulness for society. Meanwhile, according to V.G. Gorokhov, "the rapid progress of convergent technologies puts many old philosophical problems in a new way and brings to the fore a number of methodological, social, cognitive, etc. issues, the solution of which requires a high philosophical level" [5, p.12]. For the analysis of modern technogenic civilization, such a philosophical discipline as the philosophy of technology is most important: having arisen at the end of the XIX century to study technology as a factor of social and cultural changes, it has been rapidly developing since the second half of the XX century due to the fact that, according to V.V. Cheshev, "the interpenetration of the technosphere and the social environment ... led to the formulation of the problem of "technology-man" at a higher philosophical and sociological levels, requiring an appeal to the essence of technology and the essence of man" [12, p.110]. In a technogenic society, all areas of human life are associated with technology, implemented with the help of technical means and evaluated by technical reason; therefore, notes A.V. Mikhailovsky, it is "the philosophy of technology that allows us to develop all the main problems of modern philosophy in a systematic aspect - from ontology and anthropology (the ontological status of techni-

cal artifacts; the position of man in the world), epistemology (the status of know-how within knowledge) and epistemology (the subject and methods of technical (engineering) sciences) to the philosophy of culture (design in the cultural system, the theory of cultural types) and ethics and axiology (the problem of "technical evil", the social assessment of technology)"[7, p.226-227]. As you can see, almost all traditional problems of philosophy require revision in the conditions of a technogenic society. What social functions does philosophy perform in this society, and what contribution can the philosophy of technology make to their fulfillment?

As a rule, the social functions of philosophy are divided into ideological (useful for society as a whole) and methodological (useful for science). Within the framework of the ideological function, philosophy helps to comprehend life, finding the highest ideological guidelines; develops ideas about the basic values of culture; forms a cultural personality from a person, taking him out of the narrow framework of everyday thinking. The methodological function is manifested in the fact that philosophical methods create the preconditions for scientific discoveries: philosophy (as opposed to the deepening specialization of scientists) coordinates the methods of scientific research, identifies the links between scientific disciplines and synthesizes their achievements into a single system of knowledge, providing substantiation of the conceptual and theoretical structures of scientific knowledge. But are these features real today?

Philosophy performs worldview functions, according to V.S. Stepin, by reflecting on the fundamental worldview universals of culture: "Philosophy problematizes and analyzes what the common sense of the era takes for granted." This process is especially important in such periods of the life of society, when it can no longer preserve the old way of life and "the previously established meanings of the universals of culture are not able to provide ... the interaction of new and traditional types and methods of activity." Then the mission falls to the lot of philosophy "to invent new ones instead of old life meanings" [11, p. 6-7]. And since in the modern era the pace of cultural change has increased many times over, today this function of philosophy is becoming one of the most important. In addition, philosophy, emphasizes V.A. Lektorsky, has always been not only "the highest form of self-reflection of culture, that is, analysis of the ultimate foundations of cognition, activity and evaluation": it can also be regarded as "self-criticism of culture" [6, p. 141], as a denial of the dominant universals and the search for new ones. The philosophy of technology, therefore, should contribute to this philosophical reflection and renewal of the usual way of thinking, carrying out, according to V.V. Cheshev, "a worldview discussion

of the nature of technology and its role in society" [12, p. 105]. But today, philosophy, realizing this function in a technogenic society, inevitably opposes the "technical mind" and its basic principles [10]. Consequently, while creating new meanings and shaping new views on the world, philosophy rejects its technogenic dependence. Criticizing technogenic civilization for all the global problems generated by it, philosophy should point to other worldview guidelines. Is the philosophy of technology capable of this? First of all, it will have to postulate the possibility of getting out of the civilizational deadlock, excluding the idea of technology as an alien force imposed on humanity, the development of which occurs automatically, despite the wishes of people. Such an interpretation of technology is called naturalistic and is criticized by modern representatives of the philosophy of technology. Instead, it is proposed to consider technology and the technosphere formed by it as a subsystem of society (industrial technologies are understood as a kind of social technologies). Only then does the ideological possibility of restoring control over technical reality appear: mankind is invited to humanize technology by humanizing society. Based on this interpretation of technical reality, new types of social action can be proposed. Thus, philosophy of technology can realize its ideological function by de-objectifying the concept of technology and showing the conditionality of technical activity by non-technical factors. In this case, it is possible to build a new, non-technogenic worldview, on the basis of which it will be possible to propose new values and develop programs of practical activity that open up a new historical perspective for humanity.

The implementation of the methodological function of philosophy in a technogenic society is also related to the philosophy of technology, since the modern stage of development of scientific knowledge is initially aimed at finding technological applications. This stage began to be called technoscience, emphasizing, according to V.G. Gorokhov, its focus on solving specific scientific and technical problems: modern "nano-, bio-, info- and cognitive technologies have invaded such sensitive areas of social, biological and mental life, that sometimes they became their own philosophy" [2, p.181]. Moreover, philosophies also predict techno-scientific transformation: according to I.Yu. Alekseev, "philosophical technologies can also enter the number of socio-humanitarian technologies," ranging from "logical technologies used to solve highly specialized problems to worldview technologies" [5, p. 14]. Obviously, in order to clarify the fundamental theories of science in its traditional guise, the philosophy of technology could do little, but when creating NBICS technologies that transform the human body and mind, when science transitions to technoscience, it will be nec-

essary to analyze the position of humanity in a changed world, including - rethinking of concepts that were not previously used in the theory of knowledge and therefore require clarification of the meaning. For example, in a technogenic society, the customary opposition of the artificial and the natural, according to V.S. Stepin's research, is blurred: "The concept of the artificial as a special kind of natural is organically included in the modern concept of the evolution of the Universe... Human activity appears here as a special type of objective interactions that arise during cosmic evolution, and the objects generated by it as a natural result of this evolution" [1, p.10-11]. A new understanding of technical reality and technical activity will be required to create a picture of the world. Thus, having abandoned the naturalistic understanding of technology, it will be necessary to redefine such concepts as "technology", "technosphere", etc. Philosophy should analyze not individual technical objects and technological processes, but the technogenic environment as a whole, assuming it to be an integral object - a global technical system that develops according to its internal laws, regardless of human activity. For the theoretical reflection of the socio-cultural aspects of technical reality, one can understand the technogenic environment as a subsystem inscribed in social structures: created on the basis of a project and included in the social environment to perform certain functions, affecting the functioning and development of various social institutions and cultural norms. In particular, one should especially consider the socio-cultural strategies for creating technologies that fit them into the general social framework.

Thus, the methodological function of the philosophy of technology can be realized through a categorical analysis of concepts related to technical reality and the formation of new philosophical approaches reflecting its various aspects. It is more and more difficult to control technical reality, and it is more and more difficult to predict the transformations caused by it in society and culture. The manageability of the technosphere is being questioned: the mistakes of people with unprecedented technical power can become catastrophic. If the modern worldview requires the rejection of the usual ideas, then the creation of new philosophical approaches will not only show possible options for the picture of the world, but also help predict the results of the implementation of programs for the technical transformation of the world and man.

Thus, it is precisely the philosophy of technology, which reveals the peculiarity of technical reality and technical activity, that may turn out to be the leader of modern philosophical search. The rest of the fields of philosophy are forced to analyze the transformation of their objects of research in

conditions when the technosphere displaces the natural environment both in nature and in man, and for this they will have to use the achievements of the philosophy of technology, reformulating traditional philosophical problems in the language it proposed.

Is this philosophical discipline still young enough to cope with the responsibilities entrusted to it? Much has already been done to de-objectify the concept of technology and create new philosophical approaches. As V.G. Gorokhov notes, "technology in the philosophy of technology has long been not reduced to artifacts only": entire technical systems are considered, which include, in addition to the actual technical objects, "and the people serving them, and the infrastructure (i.e. social structures), and technical activities for their creation and use, and technical knowledge" [3, p.81]. It is also recognized that, according to V.V. Cheshev, when creating large socio-technical systems, it is necessary to take into account the interaction of the technosphere with "society as a systemic whole" [12, p.108]. In alliance with philosophy, a social assessment of technology began to develop, allowing one to assess the potential risks from the use of the latest technologies. But is that enough? If the philosophy of technology wants to bring its developments to the logical end and point out a way out of the civilizational impasse, according to V.S. Stepin, "to find new foundations of human life", then it "needs to trace where and how in the depths of modern technogenic culture points growth of new values, different from those on the basis of which ... the technogenic civilization develops" [11, p.9-10]. At the same time, "the guidelines for the search for new values should be the principles of preserving humanity, society and the biosphere as a single, complex developing system" [1, p. 19]. At one time, philosophers, having substantiated the human right to change the world, did a lot to ensure that technologies entered human life: according to V.A. Lektorsky, for science and technology, it was philosophy that "was a way to fit them into culture - their kind of cultural legitimation" [6, p.141]. Today, V.G. Gorokhov points out, we need "not a rejection of technology in general, from a technical relationship to the world, without which the existence of human civilization is impossible, but the search for new, more humane forms of this relationship" [5, p.10]. Consequently, V.V. Cheshev is right, who asserted that "the most promising direction is anthropological research, in the light of which an active-cultural explanation of the nature of technology and the technical knowledge accompanying its development is given" [12, p.115]. So, according to A.V. Mikhailovsky, philosophy that develops in a technogenic society and shows it the way out of a civilizational deadlock "should ultimately become "a cultural philosophy of technology""[7,p.227], that is, explore the

technogenic transformations of human existence.

It is necessary to put forward new, non-technogenic values and methods of thinking - and abandon the hope today to receive the recognition of the majority, which still thinks within the framework of technical rationality. Philosophy, which criticizes habitual views, will inevitably stand in opposition to the dominant worldview and will no longer be able to justify itself within its framework. It will become even more useless (in the technological sense of the word) and will face the threat of further shrinking its social base. But the explanation of the essence of technology and the assessment of the changes it makes in human life are precisely the questions that are increasingly asked by thinking people who are worried about the current situation and critically assessing the scientific and technical optimism of the previous era. Therefore, the philosophy of technology, providing rationally substantiated answers, can help not only humanity, but also philosophy, returning it to the lost interest of people and showing that philosophical discourse is indispensable in analyzing the future, which is not available for accurate calculations.

Thus, in order for philosophy in a technogenic society to fulfill its social functions, research on the philosophy of technology is necessary. It is this philosophical discipline that deserves the most attention and can bring the greatest benefit in the modern era - both to society and to other areas of philosophy.

References

1. Analysis of the structure and dynamics of science in a socio-cultural context. Materials of discussion of the selected works of V.S. Stepin // Problems of Philosophy. – 2017. – №12. – P.5-31.
2. Gorokhov V.G. The place and role of the philosophy of technology in modern philosophy and its organic connection with the philosophy of science // Philosophy of science. – Iss.16. – 2011. – P.181-199.
3. Gorokhov V.G. Technique, technology, design - social engineering, social and humanitarian technologies, social design // Epistemology and Philosophy of Science. – 2012. – №1. – P.80-89.
4. Kasavin I.T. Interdisciplinary research and social picture of the world // Philosophy of Science. – Iss.19. – M.: IP RAS, 2014. – P.9-26.

5. Convergence of biological, informational, nano- and cognitive technologies: a challenge to philosophy (materials of the "round table") // Problems of Philosophy. – 2012. – №12. – P.3-23.
6. Lektorsky V.A. Why philosophy is needed today // Questions of philosophy. – 2017. – №7. – P.140-144.
7. Mikhailovsky A.V. Four main questions of the philosophy of technology. About Hans Poser's book "Homo Creator" // Epistemology and Philosophy of Science. – 2019. – V. 56. – № 3. – P. 225–233.
8. Popkova N.V. Philosophical culture or philosophical technology? // Culture and art. – 2015. – № 2. – P. 133?Popkova N.V. The place of philosophy in the culture of technogenic society: criticism of technical reason // Culture and Art. – 2019. – № 4. – P. 37-52. DOI: 10.7256/2454-0625.2019.4.29324.
9. Rozin V.M. To act taking into account the complex nature of man // Philosophy of Science. – Iss.16. – 2011. – P.124-167.
10. Stepin, V.S. Constructive and prognostic functions of philosophy // Questions of philosophy. – 2009. – №1. – P.5-10.
11. Cheshev V.V. Engineering thinking in an anthropological context // Philosophy of Science and Technology. – 2016. – V. 21. – № 1. – P. 104–117.

«ARABESQUE» OF WINNERS

Redko Anatoly Maksimovich

Candidate of Pedagogic Sciences, Associate Professor
Perm State Institute of Culture
Perm, Russia

Abstract. *The article gives the impressions, reasoning of the author of the article, who is present as a spectator from the Perm ballet event of an international scale.*

Keywords: *ballet by A.P. Chekhov, competition, classical choreography, modern choreography.*

Much was unexpected about the "Arabesque-2020": its postponement from April-May to October-November; reduction of the new-autumn-term by three days; absence of the audience in the auditorium, except for the opening evening, when the premiere of "Anyuta" to music by V. Gavrilin took place in choreography and with the participation of V. V. Vasiliev, and the opening evening of the first round; the number - unlike the one declared in the spring - there are only 34 participants in the main program and 76 in the modern choreography competition.

The well-known circumstances of irresistible force brought inconsistency to the usual routine: they confused route maps, sowed confusion in the ranks of the contestants, upset ballet fans who had to watch the competition by broadcast, and not "live". Both directorates - "Arabesque" (director E.B. Zavershinskaya), Perm Academic Opera and Ballet Theater named after P.I. Tchaikovsky (general director A. Borisov, from this year director of the Stanislavsky and Nemirovich-Danchenko Musical Theater Moscow) corrected the situation, as they say, on the go, skillfully and painlessly settling the questions and problems that arose. Their skills and professionalism are an example of selfless service to the cause. It's worth a lot.

The meetings with the dance did not disappoint, although the format has changed in many ways: this is the main and indisputable result of the entire enterprise, the only one expected and confirmed by the efforts of those who linked their fate and profession with dance. There are arguments "against", like those that according to the results of the competition

the Grand Prix was not awarded, and many awards did not find owners, they are not convincing. In fact, everyone who came to "Arabesque" won, watched its program in the hall (only members of two juries and some teachers-tutors), on gadgets and TV screens (spectators, admirers and fans), the participants themselves, who showed will, stoicism and taste to promotion to theatrical Olympus. It turned out exactly the same as it always happens: the best mastered the marathon, received attention, felt the scent of laurel on their foreheads, "posted" photos of their diplomas and medals on social networks. To them and those who took care of them - bow and applause.

Even in a truncated form, "Arabesque-2020" turned out to be remarkable, did not lose its own face, was remembered for its vivid performances, which received responses (and likes) even through the glaring glass of mobile devices, which received signals from the autumn capital of the world ballet, Perm. In the premiere performance of "Anyuta", V. Vasiliev, the artistic director of the competition and ballet director, appeared on the stage: at the age of 80, he played the role of the heroine's father, and the performance, thanks to the participation of the first dancer of the XX century, sounded special: like the whole story told by A. P. Chekhov in his "Anna on the Neck", was retold on behalf of Pyotr Leontyevich, a calligraphy and drawing teacher in a gymnasium, who drank with grief after the death of his wife and became unhappy, lost, homeless. Vasiliev gave a portrait with touches and nuances of the high Moscow Art School, the dance speech of his character and those about whom it was conducted sounded in Chekhov's words: "... Pyotr Leontyich drank more than before, there was no money, and the harmonium was sold for a long time. The boys now did not let him go alone into the street and they all watched him so that he would not fall; and when, during a ride on Staro-Kievskaya, they met Anya on a pair with a tie-in on departure and Artynov on the box instead of a coachman, Pyotr Leontyich took off his top hat and was going to shout something, and Petya and Andryusha took him by the arms and said pleadingly: it is necessary, daddy ... It will be fine, daddy ..." (see: photo 1.).



Photo1. Ballet "Anyuta". Petr Leontievich - V.V. Vasiliev. Petya, Andryusha (Anyuta brothers) - students of the Perm Choreographic School M. Nurmukhametov, D. Pavelkin. PSATOB named after P.I. Tchaikovsky.

V.V. Vasiliev - an artist- touched by the whole world, to which - happiness to everyone who has connected or is going to connect life with the theater. In the Perm "Anyuta", an exemplary ensemble culture of both ballet companies (chief choreographer A. Pimonov) and orchestral (chief conductor A. Abashev), the main thing happened: the artistic director of the competition, who staged the ballet after A.P. Chekhov and who performed an important part in it, he marked the parallels and meridians of creativity, and more than that, the boundless movement of the artistic soul itself. "Anyuta" with V.V. Vasiliev became an important lesson for all its participants, and they tried to learn this lesson and reflect it in each of the three rounds and at the modern choreography competition.

V.V. Vasiliev noted at its opening that initially there were so many applications for this competition that we did not know how we could evaluate everyone who wanted to take part in it. The pandemic has made its own tough adjustments. Due to the closure of borders and restrictions in our country, most of the participants could not come. Therefore, the number of stars and discoveries for which "Arabesque" has always been famous, this time became much less. Nevertheless, I can consider this competition

not only successful, but a historical event in the history and development of Russian classical dance. This competition showed that even the most terrible events cannot destroy the strong foundation built on the traditions of the Russian school and the desire for its development and improvement. The most valuable thing for me was that I saw our performers grow from tour to tour. For me, any competition is important, first of all, because it gives the artists the opportunity to see each other and learn everything that may not have been considered important before. I am convinced that when they return home, they will become at least a little better and stronger, and this competition will become unforgettable for them.

Not everything has worked out yet, but a lot has outlined the prospects, showed inclinations, to outline the way.

I would like to name all the heroes and winners of the current "Arabesque". Dancers who perform successfully in the absence of spectators, for two juries and a few colleagues. Likewise, the referees are undoubtedly the organizers of the competition, without whose hard work and patience it would not have happened.

Almost all the laureates and diploma winners of the past biennale are well trained and physically educated, but others still lack what is called "dance", in the concept of which freedom and musicality of movement, the picturesqueness of connecting elements and transitions, the continuity of the line of presentation of the choreographic text are traditionally invested. It, the text, sometimes crumbles into pieces and fragments, loses its integrity, breaks off with a short breath, exists outside the musical form, resembles the alphabet, not speech.

A common problem for modern ballet theater, obviously, arises from a protracted apprenticeship, where diligence often dominates creativity and somewhat depressing the expressiveness of the dance. Competition for this and competition to indicate it. And he points out, paying attention to the achievements and capabilities of its laureates: Kubanych Shamakeev (gold medal, Georgy Zorich prize "To the dancer for the purity of technique and artistry of performance" and the Press Jury Prize), Liri Vakabayashi (silver medal and Press Jury Prize), Subedei Dangyt (silver medal), Camilla Ismagilova, Aleksandra Kris, Rassen, Marat Safin (bronze medals), Natalia Pivkina, Ksenia Ring (diplomas) - in the senior group; Victoria Snigur, Diana Tovtyn, Ivan Sorokin (silver medals), Daria Chugunova, Ulyana Moksheva (bronze medals), Anastasia Kaplina, Bogdan Pleshakov, Tamila Shishkalova (diplomas) - for the junior group.

It is noteworthy that the Prize named after N. Dudinskaya "For loyalty to the traditions of the Russian ballet school" was awarded to the Perm

State Choreographic School, which simultaneously indicates the strong connection between the two schools - Perm and St. Petersburg, and their features: purity of style, musicality, expressive performance.

A special section-competition of modern choreography, in which both choreographers and performers can compete, is a panorama of the so-called free dance, based on various performing techniques and directions: from modern and contemporary to contact improvisation and strip plastic.

The autumn meeting in Perm showed that the artistic conflict between the "contemporaries" and the "classics" has weakened and almost disappeared. The former no longer need to defend their equality with the latter (the geography of alternative types of dance has expanded to the limit: now it is not only Moscow, Petersburg, Perm, Yekaterinburg, Chelyabinsk, but also many other cities of Russia, as the competition showed), and the adherents of Terpsichora, who ruled the ballet right up to Until the beginning of the XX century, they gladly go to the "neighboring" territories, where neither inversion, nor strict coordination, nor bodily drill not only do not interfere, but only help to master perfectly the "experimental" plastics and the most daring exercises in it.

Contemporary dance has collected its own vocabulary, no less significant than that of classical ballet. His modern dance class, where the body is brought up and trained, has acquired and received a diploma that is structurally not inferior to the Vaganov class. Universities have opened relevant departments and training programs for contemporary dance, traditional choreographic schools and campaigns are accepting graduates in the teaching staff.

At the same time, modern dance - understandably according to "Arabesque-2020" - is now experiencing a shortage of artistic ideas, as well as gifted choreographers who would produce such ideas. They put on a lot, willingly, enthusiastically, but use the same patterns, techniques, solutions, reducing the search in the field of plastics and movement to the illustration of musical material of the same type of choice for many: either baroque, opera and classical "hits", or sound scans multimedia compositions available on the net, and not always shown for dance rehash soundtracks.

While watching the competitive performances, the question often arose: what was this or the number for, what the author wanted to tell them to the city and the world? Nobody denies modern dance in the "neoclassical" style, that is, dance of abstract, expressive-dance for the sake of dance, and such experiments are of interest if all the same musicality, structure, speech choreographic expressiveness are felt in them. There were similar ones at "Arabesque-2020", and the jury noted them. But those, where the

narrative, characters, character relationships, meaningful development of an idea, a thought resonating with the current time are initially important, practically merged into an indistinct and rather muddy stream of statements on the topic in general, avoided specifics, strokes and nuances, hid behind meaningful names, absolutely that did not express what the viewer saw as a process and result, comprehended by the author.

The same can be said about contemporary dancers, recalling Chekhov's doctor Dorn: "There are few brilliant talents now, it is true, but the average actor has become much taller." We know that you can dance absolutely everything - from the lunar path on the night sea to the Milky Way in the starry sky, to say nothing of human feelings, not so long ago, crying, rushing out of the "Munk's cry" from the imperfection of the world, human suffering, dislocations and the convolutions of life. "Absolutely everything is possible" is now problematic. And their root is all in the same illustrations, designation of events, feelings, emotions, while you wait for immersion into the depths of the universe, travel to the secret places of the soul, you wait for artistic confessions and sermons, revelations and confessions, insights and discoveries.

On the last day of "Arabesque 2020", both juries (main, press) of the competition celebrated performances that resonated and were filled with vibrant meanings, choreographic novelty, and non-trivial performing colors.

The greatest attention and interest aroused, perhaps, two works, two mini-performances. This is "Alone" by Y. Repitsyna (first prize for the best act of contemporary choreography, as well as a diploma from the press jury) performed by Liri Wakabayashi and Kubanych Shamakeev; "Ratutyu" by I. Tagirov (second prize among performers, diploma of the press jury for choreography and performance).

"Alone" is a duet of wanderers who find their way to the piercing voice of a duduk. A duet, where the choice coincides with the search, and the road - with knowledge.

"Ratutyu"-is a monologue of despair, but also about a choice: from complete despair and a loop dangling over a person's head, to a change of fate, when the loop becomes a stairway to heaven, and the hero rushes along it to study himself and the world.

V.V. Vasiliev emphasized that it is interesting that among the performers in contemporary dance at this competition the representatives of classical dance were the best. I would like to wish choreographers to pay more attention to the variety of choreographic movements and to the drama and development of the characters of their miniatures. Too often we see a wonderful start that gets no further development. And of course, the ending of

the numbers is very important, which we all also often lacked.



**Photo2. Participants of the Arabesque-2020 Gala Concert.
PSATOB named after P.I. Tchaikovsky.**

"Arabesque-2020" showed the stairway to heaven to future stars, becoming an example and a lesson in difficult times for the world (see: photo 2).

The XVI Yekaterina Maximova Open Russian Ballet Competition "Arabesque" became a unique event in the history of the competition. It took place in difficult conditions of restrictions associated with the pandemic, thanks to unprecedented security measures and the professional work of the administration and all services of the competition and the Perm Opera and Ballet Theater. "Arabesque 2020" was also held thanks to the daily dedicated work of doctors. The Perm Opera and Ballet Theater thanked them and asked the theater spectators to be careful and attentive to each other so that the efforts of the doctors would not be wasted.

References

Site of the Perm Opera and Ballet Theater. Competition of ballet dancers named after Ekaterina Maximova "Arabesque". Russia. Perm. Electronic resource: <http://www.arabesque.permonline.ru/>

THE SPIRITUAL POTENTIAL OF THE NORTH PEOPLES' CIRCLE DANCES

Lukina Angelina Grigorievna

Doctor of Art History, Professor at the Folk Art Department,
Arctic State Institute of Arts and Culture
Yakutsk, Russia

Abstract. *The relevance is based on the need to use the potential of the North and Arctic peoples' round dances in the modern-day practice. The article strives to promote to contemporary people the understanding of high potential of worldview ideas inherent in the North people's traditional dances. The relevance of the topic is also defined by the necessity to study and preserve archaic patterns in the dance folklore of the North and the Arctic peoples. This article discovers the spiritual potential and the functions of the North and the Arctic peoples' round dance as part of worldview ideas.*

The purpose of the article is to find the connection of the round dance to the key worldview ideas of the North people, to study this dance as one of the ways to overcome opposition and contradictions between peoples and countries, and as a universal spiritual phenomenon. The article presents the results of the analysis conducted to ascertain the spiritual potential of the circle dances, along with their relation to key worldview beliefs.

Using the dance heritage spiritual potential in the modern world will contribute to revival of circle dance forms of spiritual value and to creation of contemporary scenic interpretations. The study material may be of interest to researchers of traditional culture worldwide. Timeless values, embedded in the circle dance, are still relevant today. вложенные в круговой манец. The study material can be used for further research of ethnochoreography and by dance assemble directors in creative work and instruction. It is possible to use the results of the study in academic papers, curriculum documents for schools and universities teaching arts and culture. This article may contribute to revival and reconstruction of circle dance patterns of the peoples of the world.

Keywords: *culture, tradition, spirituality, potential, heritage, dance, Арктика, north, movement, sound, singing, unity*

Introduction

The spiritual potential of the North peoples' circle dances is underexplored in modern practice. This article discovers the spiritual potential and the functions of the North and the Arctic peoples' round dance as part of worldview ideas.

This study addresses the North and the Arctic peoples' round dance as one of the ways to preserve the spiritual potential ethnic self-image. The round dance is viewed as a universal phenomenon that encompasses traditional values of the North peoples.

The article shows the connection of the round dance to the key worldview ideas of the North people, and presents the circle dance as a spiritual phenomenon. It studies the role and the meaning of the circle dance in the modern world. The article focuses on the spiritual component of the round dance and on seamless inclusion of the round dance ideas and images in the modern culture of the North peoples.

Methodology

Methods of studying the dance culture of the North and the Arctic peoples include analysis of the nature and meaning of the circle dances in the peoples' life. The study of the circle dance phenomenon implies the study of the circle dances as an integral part of the North peoples' spiritual culture. The circle dances hold a special place in life of the North and the Arctic peoples. They are inextricably linked to domestic life, rituals, mindset, world perception, religious beliefs; they reflect value system and ethnopsychological characteristics. Dance folklore serves as an expression of cultural and social identity of the North peoples.

The article uses methods based on complex approach and system approach. It treats the round dance as a complex phenomenon with a variety of functions that reveal the spiritual potential of the round dances. Methodological basis of this study consists of the works of national researchers of Arctic and Northern studies, art history, archaeology, ethnography, folklore, ethnochoreology, and ethnopsychology, such as A.D. Avdeev, J.J. Lindenau, R.K. Maack, A.F. Middendorf, G.A. Sarychev, G.W. Steller, V.G. Bogoraz, S.P. Krasheninnikov, V.I. Jochelson, I.A. Khudyakov, V.L. Seroshevskiy, L.S. Vygotsky, V.Y. Propp, B.N. Putilov, A.S. Kargin, M.Yu. Lotman, L.M. Mosolova, E.S. Novik, A.P. Okladnikov, G.M. Vasilevich, S.N. Stebnitsky, G.P. Sokolova, and others.

Spiritual culture philosophy and aesthetic aspects of the dance culture are covered in the works of C. Lévi-Strauss, M. Eliade, E.M. Meletinsky, B.N. Putilov, S.E. Malov, V.M. Zhirmunsky, V.B. Iordansky, E.A. Koroleva, V.V. Romm, T.S. Tkachenko, T.A. Ustinova, V.I. Uralskaya, Yu. M. Churko,

L.G. Stepanov, A.G. Lukina, O.B. Buksikova, L.E. Timasheva, I.B. Sklyar, A.S. Fomin, and others.

A particular place in the study of the dance culture of the North and Arctic peoples belongs to the works of researchers that studied the dance folklore of the North, Siberia and the Far East — M.Ya Zhornitskaya, T.F. Petrova-Bytova, S.F. Karabanova, N.S. Kaplin, V.N. Nilov, A.A. Petrov, E.A. Rultyneut, N.A. Struchkova, L.E. Timasheva, and others.

Theoretical reflection on the specific features of the North and the Arctic peoples' culture can be found in the works of the researchers of traditional culture of the indigenous small-numbered peoples of the North: A.M. Aizeshadt, G.G. Alekseeva, A.F. Anisimov, N.A. Alekseev, I.S. Gurvich, A.N. Zhukova, Ch.M. Taksami, D.S. Dugarov, V.A. Tugolukov, Yu.I. Sheikin, I.S. Vdovin, Д.С. Дугарова, O.E. Dobzhanskaya, G.N. Kurilov, G.I. Varlamova, U.A. Vinokurova, and others.

Methodological basis of this study also includes papers on traditional culture by Yakut researchers A.E. Kulakovskiy, P.A. Oyunsky, G.V. Ksenofontov, S.I. Bolo, A.A. Savvin, G.U. Ergis, N.V. Emelyanov, and others.

The author draws on the works of contemporary researchers of traditional Yakut culture, such as R.I. Bravina, E.N. Romanova, P.A. Sleptsov, V.M. Nikiforov, A.E. Zakharova, and others.

The article uses method of analysis of semantic content and features of the round dance of the North and the Arctic peoples as part of their life activity.

Results and discussions

Globalization, social and economic challenges and turmoil put the cultural heritage of the North Indigenous peoples in difficult situations. One can trace the levelling of national features of the unique culture, its image system; there is a unification of the cultural norms and ways of seeing the world; the basic concepts of the traditional culture are eroding.

Loss of traditional ways of living and cultural values makes tradition culture of indigenous minorities of the North and the Arctic especially vulnerable to globalization. In the age of globalization, it is critical to revive traditional culture, to preserve and enrich the cultural heritage of the peoples of the Arctic and the North. Traditional culture determines the sense of national identity, and guarantees the preservation of peoples' key values. In this regard, the circle dances is of particular interest as a widespread complex genre of traditional culture, serving as the quintessence of folk culture.

For preservation and further development of the traditional cultures in the context of their theoretical study and application of the rich cultural

heritage of the North peoples, one should pay attention to the traditional dance culture of the Indigenous minorities of the North. Special attention should be paid to the preservation of the unique circle dance patterns as a phenomenon of the North peoples. Today it is important to research and implement the traditional dance legacy of the North and the Arctic peoples in the context of its preservation for future generations.

The circle dance is a complex cultural phenomenon of the traditional culture, which reflects many aspects of the relationship between the Northerner and the surrounding world. Traditional dances are a phenomenon of the spiritual development of the harsh northern nature. It is pleasant that the traditional dance is not a relict or museum exhibit today, but is largely involved in the life of the northern peoples as a kind of folk art. The circle dance is reviving actively and developing dynamically. Its patterns are interpreted broadly in both professional and national dance art. The most important fact is that the population still practices the circle dances, despite many factors affecting them. The circle dance is an integral part of the spiritual culture of the North peoples. Traditional dances are associated with mythological and religious beliefs, enduring moral, ethical, and aesthetic values. The symbolism of the circle dance reflects the people's value orientation. Traditional dances are a large stratum of spiritual culture. The circle dances have a great spiritual potential. In the context of the revival of national culture, traditional dances get their second wind. A careful preservation and restoration of archaic specimens occur in the light of the modern man's view. The people are aware of the strength and power of the cultural heritage, accept them as one of the ways to achieve spiritual perfection and as an effective means of asserting and strengthening the ideals of goodness and humanity. It is known that the folk culture is a determining factor in the national self-consciousness. Its revival, comprehension, and mastering, in fact, are the renewal of traditional values, deep people's knowledge system. The traditional dance heritage of the peoples inhabiting the vast expanses of the Arctic and the Far North has a great potential that can be successfully engaged in the modern world.

The circle dance is a complex with multiple functions and elements of ritualism. It implements a tribal property of traditional culture. The round dance is one of the most archaic symbols and contains the whole set of key meanings. Throughout the centuries, the indigenous peoples have created unique samples of the dance heritage. The circle dances have a special place in the traditional dance culture. In the extreme weather conditions of the stern territory, the North peoples created unique dances, narrating about the northern people's lifestyle, their world outlook, mental-

ity, and worldview. The North peoples have a particular attitude to nature. The maximum closeness and reverent attitude to nature are reflected in the kinds of folk art, including dance. That is how northern man could only survive in the cruel and harsh climatic conditions of the North.

The round dances of the peoples of the North, Siberia and the Far East have retained the deep stratum of archaic consciousness. The energy and magic of the circle dances are incredibly strong. Up to this day, the circle dances preserved vital energy and improvisational expression. The unique patterns of the North peoples' circle dances are the etalon of syncretic art. They delight us not only with ethnographic authenticity and aesthetic beauty, but also with the deep understanding of the meaning and symbolism of movements, gestures, and plastique. The dance influence on the man's psychophysical scope is enormous. The circle dances most clearly reflect the state of mind, the sphere of human feelings and emotions. The circle dances are a model of maximizing the human spiritual and emotional potential. From time immemorial, in the round dances, a person overcame self-centeredness, was involved in a strong energetic sphere, brought his consciousness in accordance with the surrounding world, nature, and the cosmos, as well as adjusted his attitude to the people around. The circle dances are performed collectively; they are characterized by the ensemble form of singing and dancing performances. A soloist leads the dance. The solo is picked up by all participants in the dance. The collective principles of the round dance were formed by the tribal ideology. A pronounced totemic nature is typical for the Even dance of sedye, Evenki deveyde, gosigor, derede, monchoray, Yukagir londol. Imitative, associative movements, throat singing, guttural sounds, aspirated sounds, rhythmic cries, imitation of bird voices constitute the primary language of the North circle dances [1]. Since ancient times, the circle dance has been performing a great communicative function. The round dance allows people to communicate, establish emotional connections, exchange information. In the round dance, a dancer is not a passive observer, but an active participant in the process of spiritual awakening and poetic inspiration. During the dance, the participants entered in a particular state of mind.

Ecstasy is one of the most complex phenomena that are characteristic of archaic arts. The ecstatic nature is specific to the circle dances of many Siberia's peoples. The Even sedye, Evenki deveyde, osoray, gosugor, deveyde, moncharay, ekhorye, deredes, hadyuge (the Evenki of Krasnoyarsk Territory), ikevun (the Evenki of Irkutsk Region), Buryat ekhor, Yakut osukhay, Yukagir londol, kheiro (Dolgan).

I.I. Georgi, S.P. Krashennnikov, R.K. Maack, V.I. Jochelson, V.L. Se-

roshevsky, L.Ya. Shternberg, A.M. Aizeshtadt, V.G. Bogoraz, G.M. Vasilevich, I.S. Vdovin, I.S. Gurvich, A.P. Okladnikov, B.E. Petri, V.A. Tugolukov, A.F. Middendorf, G.A. Sarychev, G.W. Steller, J.J. Lindenau, Ch.M. Taksami, D.S. Dugarov, T.F. Petrova-Bytova, S.I. Nikolaev, A.A. Alekseev, N.E. Petrov, E.E. Alekseev, Yu.I. Sheykin, N. Nikolaeva, and many others have emphasized the importance of round dances in the North people's life. For the traditional dance study, the works of ethnochoreographic researchers such as M.Ya. Zhornitskaya, S.F. Karabanova, T.F. Petrova-Bytova, V.N. Nilov, G.G. Alekseeva, A.G. Lukina, N.A. Struchkova, N. Nikolaeva, E.A. Rultyneut, N.S. Kaplin, L.E. Timasheva, and others, are of special importance [2].

The circle dance originated as the spiritual expression of human aspirations and desires. Through the comprehensive circle, the holistic, global understanding of reality opened out for a man. This is the philosophical essence of the circle dances, which is not only able to unite, but also to improve, elevate a man, bringing him close to nature, the cosmos, and open to him a complete picture of the world. The original solar base and change of the seasons can be seen in the circle. It originally embodied cosmic rhythm idea. A repeated execution of the circle indicates cyclicity and recurrence in principle. The versatility of the circle dance lies in its conceptual content and ideological basis. The round dance phenomenon lies not only in its form, means of expression, compositional structure, and outward attributes, but also in the worldview aspect projecting the main ideas and key concepts of ethnicity. The circle dance is one of the ways to achieve understanding of the world integrity.

The dominant idea of the North people's round dances is the unity, indissolubility of nature and a person. The sacred meaning of archaic circle dances can be traced there. This is a priority approach by the northern people to the surrounding world. The northerner seeks to live in harmony with nature and is able to coordinate their actions with the laws of nature. The North people survived in the harsh natural conditions of the Far North only due to the awareness of the inseparable link between the human beings and nature. The key ideas of the cultural heritage of the North indigenous peoples are deeply rooted in the northern nature. The round dance as a cultural code represents the semantic relationship between a man and nature.

The circle dance has a high semantic status, which allows us to consider it as a spiritual phenomenon. The collective round dances are, above all, an act of personality's self-expression. It reflects the traditional worldview, eternity, continuity of the kin and tribe life. It expresses the idea of

uniting, rallying, confirming the sacred significance of the kin and solidarity of society. The circle dance unfolds the symbols of spatial organization, processes of creating order out of chaos, self-identification with the phenomena of nature, animals, and birds.

There are many functions in the seemingly simple dance. On the one hand, the circle dance is simple and accessible, but on the other hand, it is complex and polysemous. The circle dance has a variety of functions: adaptive, indicative, normative, axiological, recreational, cognitive, informational, educative, and many others, related to life activities of the people. The round dance is a distinctive form of spiritual reflection and comprehension of the surrounding reality by man. A constantly renewing circle is adequate to the process of making, creating his own unique world. It corresponds to the idea of an ever-new sun. That is why the image of the Sun — its life giving force — is embodied in the round dances of many world peoples. The most striking symbol of the archaic circle dance is the sun. Many traditional ceremonies of the Evens and other North peoples are connected with its cult. On the solstice days, an Even's soul could get into the country of “the happiness, abundance, and universal bliss,” as it is sung in the round dance “Dyeseriye”. This understanding included the symbolic meaning of the circle in the sun course. Through the performance of the round dance, the Evens confirmed their unity with Mother Nature. This idea was also characteristic for other North peoples [3]. The circle is a classic form, which includes the idea of the indissolubility: nature – human – cosmos. The circle symbolises the eternal life cycle and renovation. The circle represents the inexorable movement that is adequate to the circle of existence. All parts of the North people's round dances are performed in the course of the sun. The participant's motion was made to the left, with the sun; thereby the dance form embodied the sunrise and sunset, a continuous rhythm of life renewal and rebirth.

The circle dance is based on the principle of repeatability. A multiple repetition of words, melody, and rhythm in the round dance talk about its ritual nature. The repetition principle is a mythological code. This is an imitation of the repeated trajectory of the worshiped sun, which goes back to the deep archaic consciousness. The circle dances were a mandatory part of the rites and rituals. The round dance is one of the ethnic identity symbols, accumulating the spiritual potential. The circle dance harmoniously combines song, poetry, and dance genres. It is a syncretic form of the traditional art of dance, which combines dance, song, music, word, onomatopoeia, throat singing, and pantomime. Syncretism is a generic property of the round dances.

A characteristic feature of the circle dance is its improvisational nature and variability. An absolute freedom of improvisation gave the opportunity to express not only regional, local specific, artistic features, but also the unique individual differences of the round dance leading singer. Not only territorial, local-specific features are represented in the circle dances, but also purely individual characteristics depending on the performance manner a particular singer-improviser. Each directing singer had his or her own style – the unique and peculiar one. The round dances are an organic part of the people's ceremonial complex. Songs and dances are an integrating part of the rite. Dance is one of the most important ritual language variations and is a kind of ritual communication.

Dances of North-East Siberia's peoples in the context of ritual culture attracted a great interest of travelers, ethnographers Siberian scholars, local historians, and political exiles to study the northern people's ethnical and cultural genesis. Dances were a part of the ritual and ceremonial complex of the northern peoples. The North people's religious beliefs were dominated by the faith in deities and nature spirits. Dancing was an integral and, in many cases, dominant component of the calendar rites and rituals of the life cycle and played a unifying role in the ceremonies. This is seen in the complex of rituals associated with the bear cult, which is characteristic for all the North peoples. From time immemorial, special importance in the northerner's life was attached to dance and plastique as a kind of folk art having a sacred nature. Dances closely related to the worship of nature, work activities, and culture of everyday life had a great social importance.

The circle dances are an active link in the complex structure of the ritual act. They often marked and materialized the main idea of a ritual. Thus, the Yakut *osuokhay* in the ceremony *ysyakh* reflects the dialogical relationship with the gods of the Upper World, the ascension, and a flight. The Even circle dance *hedye* was an organic part of the Even national holidays “*hebdyek*” and “*Evinek*”. The Evenki danced the round dances during the “*Ikenepke*” rite (the Evenki New Year), associated with meeting the sun. The Yukagir “*Londol*” was performed during the ceremonies *shahadziba*, *yododial*. The circle dances were inextricably tied with the purpose and objectives of the ritual action.

Dances were a part of the ritual and custom complexes. Deities and spirits of nature were central to the North people's religious beliefs. Dances were an essential part of calendar rites and life circle rites, and they served a purpose of integration in rites and rituals. The round dance has many versions of its origin. Many versions are based on totemic ideas. The great importance is attached to the imitation of birds and animals habits

in North people's circle dances. An exceptional place in the round dances of the North peoples is occupied by the images of deer, gull, bear, and other inhabitants of the Northern Territory. S.I. Nikolaev believes that circle dances emerged through the imitation of the marriage dance of the Siberian cranes [4] and proves that the round dances of Yakutia natives spun off from it. These dances have created the concept of a man-bird. The participants in the round dance played the role of imaginary men-birds. The Siberian crane is the sacred bird of the Evens. The Siberian crane and swan were solar symbols among the North peoples. The Evens imitated the sun symbol connecting the celestial and terrestrial spheres in the circle dance. They mimed the symbol of immortality in order not to disappear from this world. The man-bird is one of the most archaic images widely used in many nations, including the North peoples. Subjects of birds are portrayed in the cave paintings of the rivers Lena, Olekma, Aldan, i.e. in places of the North people's settlement [5]. Themes of birds are often found at the famous petroglyphs of the Lena River basin. A.A. Petrov identified people dancing in a circle with deer. M.Ya. Zhornitskaya, T.F. Petrova-Bytova associated plastique elements of the round dances with the imitation of birds and deer habits. O.N. Struchkova, N. Nikolaeva linked them to the reflection of nature and totemistic ideas [6]. An interesting version, quite justified in the North conditions, is a version of the dance *sedye* by A.A. Alekseeva, connected with protection against a military attack, when the dancing and singing served as a kind of warning signal of an enemy's attack. The Evens, when performing dances, rhythmically chanted words warning their relatives of an impending danger [7]. The Even circle dance *sedye* consisted of three parts. The dance started slowly, but gradually accelerated. The participants got into the ecstatic state, encouraging each other. A particularly important role played the dance-directing singer whose words were picked up by the dance participants. At the end of the dance, the participants reached a maximum acceleration of the dance. The key elements of *sedye* round dance are gradually accelerating jumps. This dance is rapid, flying, energetic, and temperamental. In the circle dances of the Evens, Evenki, Yukagirs, the participants demonstrated skilful mastering of birds and animals voices. The mastering of the "bird language" was passed on from generation to generation. Its ability is one way to get an insight into natural phenomena, a successful attempt of their understanding and awareness.

The northern dances are particularly plastic, soft, and flexible as well as they have a special sense of the rhythm. The dances differ from each other by a specific manner of movements performance, unique plasticity, immita-

ble melody, special sense of style, and original features. The dances of the northern peoples are an animated nature of tribal dances characterised by special closeness to nature. This is seen not only in the imitative, but also in the circle dances. The mimesis of the animals and birds habits is actively involved in the North people's round dances.

The circle dances were studied in detail most of all by the historian M.Ya. Zhornitskaya in the 50 – 60s of the last century in the territory of Yakutia, Kamchatka, and the Far East. She identified the area of existence of North people's round dances. M.Ya. Zhornitskaya introduced the North people's dances into scientific usage. Her monograph “Folk Dances of Yakutia” (Moscow, 1966) became a handbook for ethnographers, folklorists, art historians, and culture experts in Russia and abroad. The work scientifically justified and described thoroughly the traditional dances of the Yakuts, Evens, Evenki, Chukchi, and Yukaghir. It identified the area of traditional dances expansion, their specific features in a historical context, made their classification. M.Ya. Zhornitskaya described and systematized the main movements of North people's traditional dances. Her works provided the basis for researchers in their further study of the North people's traditional dance.

The North people's round dance is a unique example of the person and nature integration. The North people's circle dances especially vividly reflect the dominant idea – the indissoluble unity of man and nature [8]. The round dance is the universal archetype of the integrity symbol, the never-ending circle of life, one of the main images in the mythological world. This is one of the most democratic forms in traditional culture: the dance was performed by both the young and elderly, by those who knew and did not know how to dance. The circle dances are simple and accessible to anyone interested, based on natural human movements. The North peoples performed their dances not only to show their feelings and emotions, but for themselves, experiencing deeply personal feelings. The circle dance is one of the most spiritual dances of humanity, purifying, ennobling thoughts and feelings, improving and stimulating human vitality [9]. Originating in ancient times, the circle dance has not lost its powerful potential to unite peoples. The circle dance has the typical signs of collective consciousness [10].

Conclusion

Unification of people is a universal idea of humankind, relevant in the today's world full of threats and dangers. Our ancestors taught us an unprecedented lesson of awareness of people's need for unity in the face of life's difficulties and challenges in the modern world. In the age of high

technology, technical progress, intensive processes of globalization, the universal idea of a uniting circle sounds topical. The round dances of the North peoples are actively involved in the rapidly changing and developing world as a unique experience of spiritual transformation and ethnic identity formation.

Using the dance heritage spiritual potential in the modern world will contribute to revival of circle dance forms of spiritual value and to creation of contemporary scenic interpretations. The study material may be of interest to researchers of traditional culture worldwide. Timeless values, embedded in the circle dance, are still relevant today. The study material can be used for further research of ethnochoreography and by dance assemble directors in creative work and instruction. It is possible to use the results of the study in academic papers, curriculum documents for schools and universities teaching arts and culture. This article may contribute to revival and reconstruction of circle dance patterns of the peoples of the world.

References

1. Zhornitskaya M.Ya. Yakutia's Folk Dances. – Moscow, 1966. – P. 52, 53.
2. Zhornitskaya M.Ya. Folk Choreography of the Indigenous Population of the North-East Siberia. – Moscow, 1983. – P. 33, 38.
3. Sheykin Yu.I. The Music History of Siberia's Peoples. – Moscow, Publishing company “Eastern Literature” RAS, 2002. – P. 184, 185.
4. Alekseev A.A. The Forgotten World of Our Ancestors. Essays on the Evens Traditional Beliefs of Northwestern Verkhoyanye. – Yakutsk, 1993. – P. 14.
5. Nikolaev S.I. A Man-bird in the Round Dances of Yakutia Natives. // Polar Star. – 1982. – No. 4.
6. Okladnikova A.P., Mazin A.I. Petroglyphs in the Aldan River Basin. – Novosibirsk, 1979. – P. 106; Okladnikov A.P., Mazin A.I. Petroglyphs of the Olekma River and the Upper Amur Region. – Novosibirsk, 1976. – P. 140.
7. Struchkova N.A. The Semantics of the Basic Movements of the Yakut Round Dance Osuokhay: abstract of a thesis, PhD in History. – Ulan-Ude, 2000. – P. 10.
8. Alekseev A.A. Songs and Dances of the Evens of Verkhoyanye. – Yakutsk, 1991. – P. 6.

9. Lukina A.G., Doktorova N.I. Yakut epic: kinetics and clothes. – Novosibirsk, Nauka Publishers, 2013. – P. 11.

10. Lukina A.G. M.Ya. Zhornitskaya – researcher of the dance folklore of the North and Siberia peoples // Journal “Culture and civilization”, Vol. 1, 2020, (PDF online 20.04.2020, print 30.04.2020)

12. Angelina Lukina. Osuokhai, The Yakut Circle Dance // Sibirica: Interdisciplinary of Siberian Studies. – Vol. 17, №3, 2020. – P. 60-67. ISBN 1361-7362 (Print), ISSN 1476-6787 (Online).

DOI 10.34660/INF.2020.93.99.020

**PRODUCING AND TECHNOLOGICAL ASPECTS IN DESIGN OF SIDE
DOOR PANELS BAOJUN RM-5**

Medelets Nikita Aleksandrovich

Candidate of Art Criticism

SGMW Advanced Center, Shanghai, China

Abstract: *This article examines the design and construction features of the door panels of the Baojun RM-5 car.*

Keywords: *auto design, door panels, car shaping, Baojun RM-5.*

Model RM-5 (year of creation - 2019) of the Chinese company Baojun is distinguished by characteristic embossings on the side surfaces of the body in the area of the shoulder line, which are the main design elements of the car. A closer look at the side view of the machine reveals that the doorknobs are located inside a long, horizontal, concave surface (Fig. 1) [2]. For economic reasons, namely: in order to reduce production costs, total vehicle cost and labor intensity, it was decided to use standard door handles. In this regard, it was necessary to solve the following tasks: to place the door handles taking into account ergonomics; arrange the handles inside the concave surface; adjust the depth and quality of the concave surface, taking into account highlights, reflections on the metal; check the cross-section of the outer door panel (the cross-section of the panel should not be too embossed, as it sets the optimal position of the glass and the window-lifting mechanism located inside the door). Along with all of the above, a number of factors of the shaping of a passenger car were taken into account, such as: social, ergonomic, utilitarian and functional, safety, aesthetic, figurative and emotional, stylistic, environmental, ecological, constructive, production and technological [1].



Fig. 1 Baojun RM-5 door panels in side view (Alias 3D model). The nature of the highlights formation in the area of the shoulder line and doors is clearly demonstrated

It should be noted that on the RM-C concept (whose design was based on the production model RM-5), the door handles are integrated flush with the concave surface and their appearance does not affect the overall visual impression when viewed from the side projection of the car (Fig. 4) [4].

The attachment point for standard car door handles is usually a characteristic stamping with a recess in the center under the arm, and on the sides there are flat surfaces that serve directly for attachment. The image below (Fig. 2) shows how the issue of integrating the attachment point and the concave surface has been resolved. So, due to ergonomic features, the main horizontal stamping in depth cannot be less than the depth of the door handle, or in other words, its parameters depend on the size and position of the door handles.

In the process of creating the design of the RM-5, it was necessary to take into account the dimensions of all protruding elements (door handles, daytime running lights and taillights) located inside the horizontal stampings on the body in order to create a single complete composition [3].

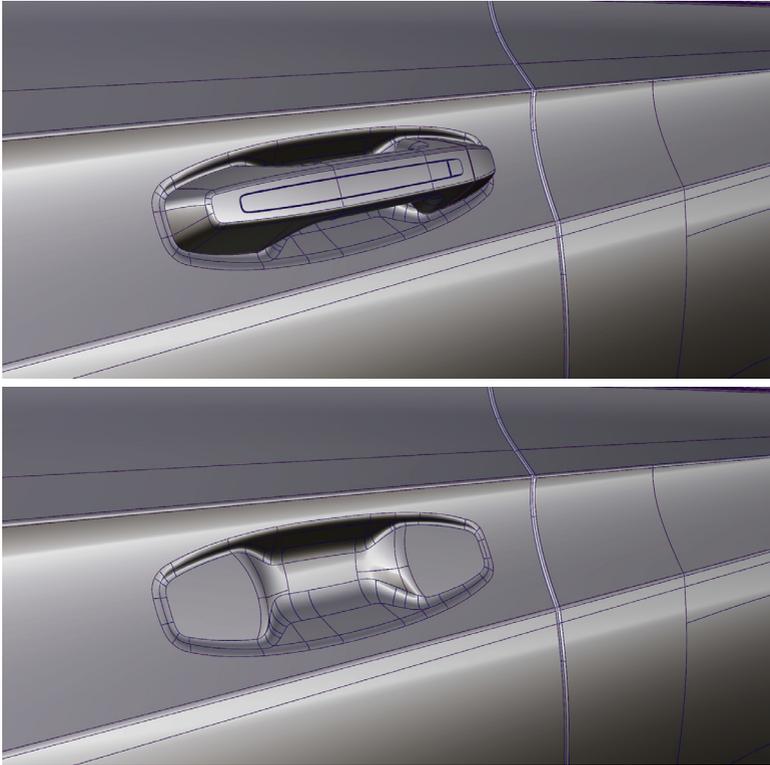


Fig. 2 Door handle and the place of its attachment to the surface of the door panel (Alias 3D model)

At the same time, the depth of the stamping on the door panels is the same depth as on the recesses at the front and rear of the car.

There is another characteristic feature in the design of door panels: the parting lines are located outside the concave horizontal surface, which significantly reduces the complexity of their stamping.

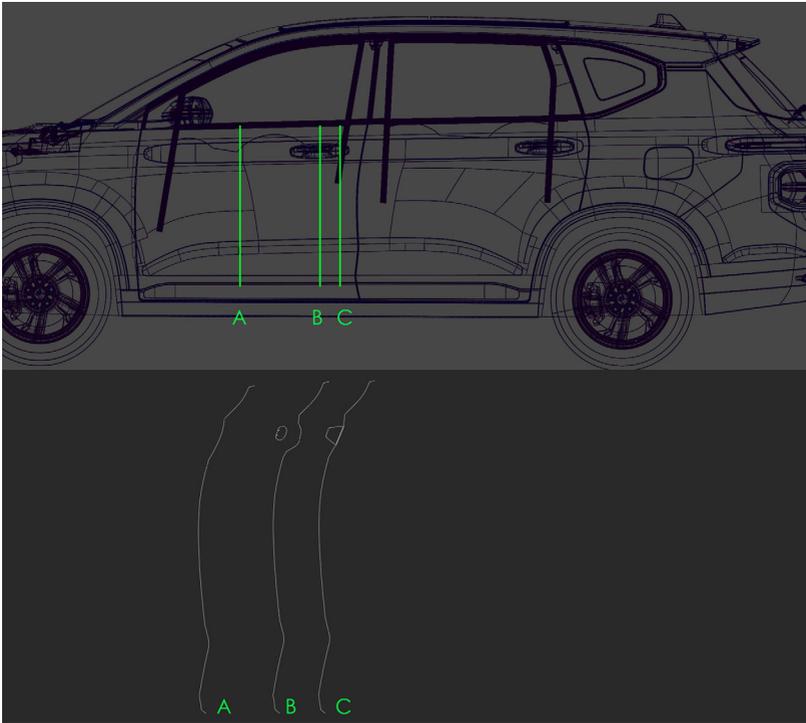


Fig. 3 Sections of the door panel in the area of the door handle and horizontal, concave stamping. The sliding rails of the window are clearly visible (Alias 3D model)

Thus, the door handles, along with other details (the block of daytime running lights and taillights) are an integral compositional element in the design of the Baojun RM-5.



Fig. 4 The mechanism of operation of the door handles of the RM-C concept is made according to the sensor-sliding principle

References

1. Medelets N.A. Forming factors of a passenger car (technological aspect). M. VNIITE, 2013.
2. BAOJUN RM-5 on the conveyor (16.11.2019) SGMW DESIGN. // [www.medelets.ru](http://medelets.ru/blog/83-baojun-rm-5-na-konveiere-1172019-sgmw-design) URL: <http://medelets.ru/blog/83-baojun-rm-5-na-konveiere-1172019-sgmw-design> (appeal date: 16.11.2020).
3. BAOJUN RM-5 // www.sgmw.com.cn URL: <https://www.sgmw.com.cn/RM-5.html#/pc> (appeal date: 16.11.2020).
4. New Baojun RM-C // www.zen.yandex.ru URL: <https://zen.yandex.ru/media/bezrulya.ru/novyi-baojun-rmc-5d0746cd53a8ad-0dc67500a5> (appeal date: 18.11.2020).

**EVOLUTION OF THE CHAMBER-INSTRUMENTAL GENRE IN THE
WORKS OF P.KHINDEMIT 1920-30-s.**

Zhuravleva Olga Ivanivna

Candidate of Art History, Professor
Humanitarian and Pedagogical Academy (branch)
V.I. Vernadsky Crimean Federal University

Razbeglova Tatiana Pavlovna

Candidate of Philosophical Sciences, Associate Professor
Humanitarian and Pedagogical Academy (branch)
V.I. Vernadsky Crimean Federal University

Abstract. *Chamber instrumental music occupies a special place in the transformation of P. Hindemith's authorial style, organically combining the synthesis of different genre elements - suite, concerto grosso techniques and an instrumental concert. Particular attention is paid to the characteristic features of the composer's signature handwriting: linear-counterpoint writing techniques, chromatic and polymodal structures, strict graphics of musical forms due to baroque polyphony, as well as the harmonic system of vocal handwriting created by the composer himself. The work traces the composer's transition from the innovative search of the first decades of the twentieth century to the mature style of the 1920 -1930 s.P. Hindemith's authority was established not only as one of the leaders of the so-called «avant-garde of the 1920 s», but also as the greatest expert on the technique of composer's writing of the past and present. And chamber instrumental genres are the composer's «laboratory of the creative method», his special area of research and experimentation in the field of ideas, images and techniques of composer writing.*

Introduction

Chamber instrumental and concert genres, starting from the Baroque era, have always been the sphere of creative searches of composers of various trends, national traditions and schools. However, in the period of classicism, the priority place was taken by the sonata-symphonic cycle, despite the highest level of composer's skill in the field of quartet, chamber ensemble and solo instrumental concert in the works of I. Haydn, V.A.

Mozart and L.V. Beethoven.

In general, the established tradition was continued in romanticism, despite the increased interest in chamber and concert genres of different orchestral composition of F. Schubert, I. Brahms, P.I. Tchaikovsky, S.I. Taneyev, A. Bruckner, G. Mahler and especially R. Strauss. In the twentieth century, the attitude towards chamber instrumental and concert music has changed significantly. The diversity of its genre varieties is becoming an important part of the innovative searches of many composers in the field of instrumental compositions, timbres, sound palette and freedom of musical forms. In many ways, the chamber ensemble and concert genres have become a universal instrument that allowed talented composers to experiment freely in the field of expressive means, styles and techniques of composer writing, defining the development paths of the musical art of the 20th century. Noting this fact, T. Levaya and O. Leontyeva write: "A new generation of young composers devotes their energies to chamber music. They hope to find in him that simplicity that will allow speaking only the most essential [5, 4].

This pattern is confirmed by the innovative works of such composers as Arnold Schoenberg (Suite for piano, clarinet, clarinet-piccolo, bass clarinet, violin, viola and cello - 1912), Igor Stravinsky (Three pieces for a quartet - 1914, Suite «The Stories of a Soldier» for violin, clarinet and piano - 1917, Symphony of wind instruments in memory of Debussy - 1920, Octet for flute, clarinet, two bassoons, two trumpets and two - 1923) and Septet for clarinet, French horn, bassoon, piano, violin and viola - 1953); Bohuslav Martinu (Concertino for cello, wind instruments, piano and percussion - 1924); Darius Millau (Sonata for Violin, Clarinet and Piano - 1936); Alfred Schnittke (Dialogue for cello and seven instruments - 1965, Hymns for chamber and instrumental ensemble - 1974-79); Edison Denisov (1,2 Chamber Symphonies - 1982-1994), etc.

However, among the famous names of the «classics of chamber and concert music of the 20th century», a special place belongs to Paul Hindemith. It was he who created the most complex system of mixed genres and styles of chamber and concert music for various instrumental ensembles, equating chamber music and symphony.

Materials and methods

A lot of scientific works are devoted to the study of P. Hindemith's creative heritage. And here the predominant importance belongs to foreign researchers - H. Merzman, I. Kemp, E. Preisner L. Noss, S. Luttmann K. Werner, A. Brainer, V. Levitsky, L. Fitzner and others (Mersmann N. Kemp I., Luttmann S., Noss L. Preussner E. Werner K. N Briner A. Lewinski

WE Finscher L.). In Russian musicology, since the first publications of B. Asafiev, Sollertinsky.

Their number increased significantly in the 60s, especially the 70-s of the twentieth century, in connection with the onset of a temporary «warming» in the cultural policy of the USSR, which made it possible to make significant adjustments to the possibility of performing and researching the Western European avant-garde, including in music. At this time, P. Hindemith's works on music theory and composition were first translated and published. Scientific works of V. Zaderatsky, L. Berger, T. Levoy, O. Leontyeva, N. Shakhnazarova, Yu. Kholopov. Schnittke, significantly enrich the ideas about the work of P. Hindemith, his musical thinking, technique of composer writing and style.

Many of the named researchers, revealing their vision and concept of P. Hindemith's work, rely on a wide range of methodologies for the analysis of archival work, philosophical, aesthetic and morphological approaches, musical-theoretical and historical analysis, developed in Russian musicology. And it determined the further path of research not only of P. Hindemith's work, but also of contemporary musical art in general.

Nevertheless, at present, a significant gap remains between the achievements of domestic and Western European scientists in this area. Until now, the richest epistolary heritage of the composer has not been published in our country, his most interesting work «The World of the Composer» has not been translated. All the more important is the work of foreign archival funds (Vienna Archives, Hindemith Institut Frankfurt Foundation), thanks to which, over the past five years, a number of the composer's works were discovered and first published, including: Septet for the author's autographed manuscript Concertstück for two alto saxophones (1933), once donated by the composer to the famous saxophonist Sigurd Ruser.

Discussion

In well-known foreign and domestic studies, a significant place is given to various aspects of the evolution of P. Hindemith's style. At the same time, the analysis of chamber instrumental works of 1920-30-s is offered in the general context of well-known works, although it is they that make it possible to see the process of the composer's transition from avant-garde searches to the purity and clarity of the style of the mature period of the composer's work. It is given to this purpose that the study of this article is devoted.

Results

Paul Hindemith (1895-1963) is the author of a huge variety of chamber

instrumental, concert and mixed genres. From an early age (from nine years old) he successfully learns to play various instruments - piano, strings (violin, viola, viola d'Amour, cello, double bass) and wind instruments. At the age of thirteen, he created his first works (string trio, numerous sonatas for strings, music for piano and other instruments), and at the age of nineteen he was already the author of a number of chamber works of a high professional level (Ensemble for Winds and Piano, Op. 10).

During the period of professional development (1915-1920), having graduated from the Frankfurt Conservatory in violin classes with A. Rebner and B. Zekles, Hindemith achieved great success as a violinist. Honing his professional skills, meeting many famous musicians, the composer works as a concertmaster in the Frankfurt Opera Orchestra and as a violinist in the string quartet of his mentor Adolf Rebner. In 1921, as a violist of the famous quartet, Likko Amara toured extensively in Europe, and in 1927 he visited the USSR for the first time. As a result, as a performer and composer, he accumulates and expands his composing experience, creating a powerful creative portfolio.

Based on German sources, the following lines can be found in the research of T. Levaya and O. Levasheva: «Hindemith took an active part in the revival of chamber music that took place in Germany after the First World War ... Chamber music found ways to listeners more easily. The situation in German music of the 1920s developed in such a way that it was chamber genres that were the focus of new trends in the musical language» [5, 32].

The twenties in the work of P. Hindemith, many European researchers call his time «Sturm und Drang». Having received recognition and success at the World Music Days in Salzburg (1922), he comes to the idea of organizing a Festival of Contemporary Music in Germany, which he realized in 1923 in the resort town of Donaueschingen, Hindemith becomes a widely known composer and public figure not only in Germany and all European countries. It was here that «... in the joint work, friendship with many well-known leading musicians, including the representative of the French Six, and especially with Darius Millau » [3, 62]. As you know, in the pre-war period, the festival was held intermittently due to a sharp change in the situation in Germany, and then was revived again in 1950 in Baden, where it continued its noble, creative mission.

Despite the intensive work in the field of intercultural interactions with the European creative intelligentsia, in the twenties P. Hindemith was still passionate about chamber music. The composer's aspiration from childhood to master the genres of instrumental music has now brought

especially varied and rich fruits: the Second and Third quartets (1921 - 23), (not counting two unpublished youths), Piano Quintet, String Trio, numerous sonatas for strings, and other instruments, Concerto for Orchestra (1925), And finally, the cycle «Kammermusik» («Chamber Music»), created by the composer for more than five years (from 1922 to 1927). It was in it that the composer's natural gift to think with pure musical and sound constructions found fertile ground.

Let us directly turn to the consideration of the features of the application of multimedia technologies in the music education of modern higher education.

The cycle «Kammermusik» consists of seven works, included in three opuses: from 1 to 5 in opuses 24 and 36 and the last two in opuses 46. In assessing the style of this cycle, the famous researcher P. Hindemith A. Schnittke emphasizes the originality works of this cycle: «In fact, most of the works of this cycle, in fact, are not" chamber music "in the traditional sense of the word» [A. Schnittke. Paul Hindemith's suite 1922, Op. 26 // Paul Hindemith. Articles and materials]. . And, in fact, the six most performed concertos of this cycle represent a new style of composer's writing in comparison with the works created earlier. First of all, each of these pieces is written for a small instrumental ensemble, often unusual in composition. For instance:

Kammermusik No. 1, op. 24 (1922) written for an ensemble of twelve instruments, including piano, harmonium and a large number of percussion instruments.

Kammermusik, no. 2 op. 24 (1922) created for the wind quintet.

Kammermusik No. 2, op. 36 (1924) - a type of piano concerto interpreted as an ensemble of soloists with twelve instruments.

Kammermusik No. 3, op. 36 (1925) - cello concerto with a wide polyphony of ten instruments.

Kammermusik No. 4, op. 36 (1925) - a five-part violin concerto with elements of jazz coming into fashion.

Kammermusik No. 5, op. 36 (1925) - concerto for viola and wind instruments with the addition of cello and double bass.

Kammermusik No. 6, op. 46 (1927) - the most delicate score with violin solo by d'Amour against the background of strings.

Kammermusik No. 7, op. 46 (1927), - concerto for organ and chamber orchestra.

The aesthetic and stylistic guidelines of the composer in the 1920-s are determined by the direction of neoclassicism and, as Zvirad Kogutek notes «The composer's thinking style is characterized by a «perfect form»

(according to F. Busoni) and its striving for stable and reliable forms [2, 178].

However, the position of P. Hindemith as the creator of the aesthetics of neoclassicism fundamentally distinguishes him from I. Stravinsky «... if Stravinsky «projects the past into the present», «styling sounding melodies or creating his own themes», then Hindemith, in addition, «projects the present into the past» «combining different melodies and themes (old and modern) into a single complex different methods of counterpoint writing» [3,231].

In these conditions, the most important for the composer is the authenticity of the counterpoint language and the Baroque style and the work of I.S. Bach, updated with the latest modal-intonation techniques and compositional techniques of the XX century.

Noting these features of the evolution of the composer's style, Yu. Kholopov writes: «Having experienced a fleeting fascination with various modern trends, the composer plunges deeper and deeper into the style of I.S. Bach, following whose model he renews old musical forms (toccata, fugue, passacaglia, canon, variations, fantasies, etc.), subordinating them to modern thinking. The search for «new beauty» leads the composer to the Middle Ages and Baroque, Gregorian chant and folk song. In them he finds eternal humanistic ideals, an objective view of the world, graphic linear melody, rational polyphonic forms, strict clarity of composition, an independent, strictly traceable line of each instrument, widespread use of pre-classical principles of concert performance» [7,221].

Many of Hindemith's works, including the Kammermusik cycle, can undoubtedly serve as an example of such an attitude of the composer to the Baroque style, despite the fact that researchers sometimes interpret this cycle as an example of the stylization of counterpoint art. However, in this "small encyclopedia" of chamber music, clear deviations from the neoclassical canons are visible. They manifest themselves in the grotesque, extravagant dance of rhythms, so characteristic of the new trends in European music of those years (Kammermusik No. 4, op. 36 (1925), in the impressionist techniques of sonic and timbre colorfulness (Kammermusik No. 6, op. 46 (1927), expressive nervousness, abruptly replaced by stiffness and prostration (Suite 1922).

Thus, the composer's original signature style is gradually formed. Along with the revival of the principles of writing strict and free polyphony, Hindemith develops of chromatic scale «extended fret-tone system», where the degree of gravitation and affinity of sounds of the twelve-tone series to the fundamental tone is regulated by the acoustic properties of

the overtones scale. Under these conditions, his system allows to consider in a new way the nature of dissonance and its resolution, where «... hard dissonance turns into a softer one, thus transforming the foundations of the tempered system, which has existed in musical art for more than two hundred years» [5, 205]. The nature and functions of harmony are significantly rethought: «Thus, in his system the tritone acts as a dominant in relation to the fundamental tone, and any accord consisting of at least three tones in any acoustic conjugation of sounds is considered a chord» [5, 207]. It is these features of the musical language that will determine the further evolution of the composer's authorial style throughout his creative life, up to the last opus.

Among the most important stages of this path - not only the creation of the largest works that glorified P. Hindemith - (symphonies and operas «The Artist Mathis» and «Harmony of the World» - 1934, 1951, symphonies – «Serena» - 1946, in Es -1940, in E, H, for brass band - 1951, symphnietta in E -1949, numerous concerts, but also works written by «Order or by occasion». Among them, «Concert Music for Strings and Wind Instruments (Boston Symphony Orchestra)», Op. 50 (1930), created for the 50-th anniversary of this renowned orchestra.

The beginning of the 1930-s was the heyday of P. Hindemith's diverse creative activity. He continues to tour around the world, working at the Berlin School of Music, where he teaches a composition class. Lectures on «Innovative systems for organizing the musical language» in many European universities and America. He is invited to jubilee celebrations (the 100th anniversary of I. Brahms in Vienna), international festivals and congresses (the international congress of Arab music in Cairo). He is the author of numerous compositions in various genres of opera, symphonic, chamber instrumental and vocal music.

Significant changes are taking place in the sphere of the composer's musical thinking. At the turn of the 20-30-s of the last century, Hindemith comes to a diffusion of genres, where there is no line between chamber, concert and symphonic works. Such a transformation is especially noticeable in chamber and concert genres, which were of universal importance for the composer, and many of the symphonies created during these years are no less important than his own symphonies.

Conclusion

Various genres of chamber instrumental music of the 1920s – 1930s are one of the brightest examples of P. Hindemith's creative maturity and technical skill. They became the turning point in P. Hindemith's consciousness - the result of avant-garde searches and the beginning of a

new mature period characterized by the universality of artistic and musical interests and the purity of the musical style.

In the chamber instrumental genre one can find all the characteristic features of the composer's style - high intellectuality of reflections, extreme tension of feelings, sublime detachment and fragile sophistication of images, complexity of polyphonic forms and graphic clarity of form, colorful instrumental tones. etc., the deliberate rigidity of harmonic combinations.

And, despite all the complexity of the musical language and style, these works have certain features of theatricality, expressed in the intonation-genre nature of the thematism, which allows them to be perceived by a wide audience of music lovers. Emphasizing these features of the composer's style, B. Asafiev wrote: «There are no abstract ideas, abstract constructions in Hindemith's work. His musical images are bright and tangible. He is a generous melodist with inexhaustible imagination. His melodies are tart and at the same time capricious, free and give the impression of a picturesque drawing» [1,56]. Much later, in the famous book «Dialogues. Memories. Reflections» I. Stravinsky, despite all the complexity of his attitude to the work of his contemporary, writes: «The appearance of Hindemith in the musical life of our days should be assessed as a happy event: he is a representative of a healthy person. ..., the beginning of light in the midst of all the surrounding darkness» [6, 292].

References

1. Glebov I. Elements of Hindemith's style // Foreign music of the XX century. - M.: 1975. The Work of Paul Hindemith: Elements of Hindemith's Style: Piano in the Work of Hindemith ... - Leningrad: Triton, 1927-1928– 58 p. <https://www.bibliofond.ru/view.aspx?id=732769>
2. Kogoutek C. Technique of composition in the music of the twentieth century / C. Kogutek; [trans. with czech. K. Ivanova]. - M.: Music, 1976, - 368 p. <https://www.bibliofond.ru/view.aspx?id=732769>.
3. Paul Hindemith: articles and materials / I. Prudnikova, comp. M.: Soviet composer, 1979. - 260 p.
4. Paul Hindemith: Music must be turned into moral strength. ClassicMusicNews.Ru <https://www.classicalmusicnews.ru/signdates/paul-hindemith-birthday/>
5. Levaya T., Leontyeva O. Paul Hindemith: Life and Works. - M.: Muzyka, 1974. - 448 p.
6. <https://www.bibliofond.ru/view.aspx?id=732769>
7. Stravinsky I. Dialogues. Memories. Reflections M.: Music, 1971. - 450 p.
8. Kholopov Yu. N. About three foreign systems of harmony // Music and modernity. Issue 4. M.: Music, 1966 – P. 216-329.

REFLECTION OF THE RITES OF PASSAGE IN THE BEAR CEREMONY OF THE MANSI (VOGULS)

Popova Svetlana Alekseevna

Candidate of Historical Sciences, Lead Research Officer
Ob-Ugric Institute of Applied Research and Development

Abstract. *The Mansi ritual system reflects different spheres of the people's worldview and includes many complexes. In the "scenario" of the bear holiday, we are dealing with fragments of many previous rituals. All these rituals are syncretic, have different paths of evolution, and in the process of the development of the bear holiday they have been repeatedly changed and rethought. Many authors have paid attention to the presence of common features of the Mansi bear holiday with the rites of the life cycle. We reveal this position by comparing some of the specific signs inherent in the bear ceremony, on the one hand, and the rituals performed at the transitional moments of a person's life, on the other hand.*

Keywords: *Mansi/Voguls, bear holiday/ceremony, death, birth, initiation, temporary death.*

In the traditional culture of the Mansi, two types of bear holidays are distinguished: trade-sporadic and socially-periodic. In this report, we analyze the most famous holiday in the literature - a sporadic trade holiday. A sporadic festival was held on the occasion of the hunting of a bear and was intended to be used for rituals that would promote good luck in future trade.

During the study of this phenomenon, it was revealed that the rituals of the Mansi bear holiday are based on the relationship of mutual transition of life and death, reflecting the idea of the revival of animals and parallels in the rituals of the human life cycle. The connection between the bear ceremony and the rituals of the life cycle reflects the most ancient layer of the people's worldview. In traditional Mansi views, the life cycle begins with death [1]. The famous Russian scientist, researcher of the culture of the Mansi people V.N. Chernetsov believes: "The heyday bear holiday was based on three main ideas: 1. Murder. 2. Eating the body of a bear. 3. The revival of the bear and his heavenly journey to the "heavenly father" [2: 40]. In our opinion, these ideas correspond to the signs of threefoldness

in the rites of passage, or the human life cycle. This cycle consists in the transition from one state to another: 1 - separation of a person from the familiar environment and a break with the past; 2 - intermediate state of the deceased; 3 - the return of the reborn individual to the community of living people [1: 39-40]. The ritualism of the bear holiday consists of a continuous mythological space-time cycle of transitions from one state to another.

Finnish scientist A. Kannisto, who observed bear festivals near Mansi (1901-1906), writes: "Initially, the holiday was arranged for the soul of a killed bear, and its numerous details <...> remind the rituals that are performed by Voguls at the funeral of relatives to treat and pacify deceased" [3: 31]. The vestiges of the funeral rite can be observed throughout the festival. Even at the den, right after the successful catch of the bear, a commemoration is arranged for it. A fire is made, tea is boiled, food is laid out. Following the norms of funeral rituals, a table is erected near the bear, a treat is placed on it, thereby "inviting" the bear for a joint meal. Immediately after delivering the bear's head skin from the forest to the house, the owner of the hunted animal closes his eyes with coins, and covers his nose and mouth with pieces of birch bark or metal plates. Covering the holes, by analogy with the funeral rite, can symbolize a ritual mask. The Mansi have a special cover for the face of the deceased (the so-called burial mask), because it is believed that the deceased is a representative of the other world, therefore he should not see the living. Fresh hot food is put in front of the bear's head every morning and in the evening, from which steam emanates, which, allegedly, is "food" for him because he can no longer eat the usual food. If we look deep into the tradition, we again observe similarities with the rituals of the funeral rite: the Mansi "invite" a deceased relative to a daily meal twice a day - in the morning at sunrise and in the evening at sunset. This time of day corresponds to a transient state. By inviting the deceased to a meal at a given time of day, the situation of the invasion of another world at a time determined by the ritual is imitated, which is not so dangerous for the living.

In order for the bear to acquire a new incarnation, it is necessary to propitiate and lead him back to the upper world, keeping the remains (bones) of the animal intact. Then the bear will not take revenge, but may still return to its former habitat and again become the prey of the hunter. To this end, after the end of the holiday and eating the bear's meat, its bones are not crushed, but ritually "buried". They are put into a specially equipped pit, the Mansi call it a "holy place", very similar to a traditional burial. A shallow rectangular hole is covered with birch bark, bones, fangs, and sometimes a bear's skull are folded into it, then they are covered with earth and covered

with birch bark. M. Eliade attributes the preservation of animal bones to the hunting culture; this "symbolizes the highest principle of animal life, the matrix on which flesh is constantly growing" [4: 237]. Similar views remain with the Mansi: if the bones are left intact, then meat will grow and the beast will be able to revive, but this takes some time. In this connection, the "holy place" in the idea of rebirth can be seen as a receptacle for an intermediate = incubation stay of an object, in this case a bear.

At bear festivals, the death of a bear is mythologized, perceived not as literal, but as temporary, only in order to move from one state to another. Therefore, in the next cycle of rituals, Mansi ideas related to maternity rituals appear. At the very beginning, back in the forest, when the skin is separated from the bones, the first incision is made to "*untie the strings of the fur coat*" at the navel, which is comparable to the separation of the fetus from the umbilical cord in the act of birth. From the moment of the first incision, the bear is no longer presented as deceased, but as a newborn. Therefore, the rituals of making a cradle (or hanging stage) and placing a baby in it follow. The symbolic cradle for a "newborn" bear is an arc woven from twigs, fastened by three crossbars, also woven, twigs, this device looks more like a couch. The cradle of the beast in myths is represented as "*a nest covered with black fur, red fur*", "*I go out of a sable nest, an animal nest*". In reality, the skin of a white deer is put on the woven rods as "fur". The skin of the bear is rolled up and laid in the cradle so that the head rests on the outstretched forepaws, in the so-called "ritual pose". In this position, the bear is in the cradle until the end of the holiday, so it can also be considered a container for the intermediate stay of the object (bear) until the next transition.

The idea of the mythological cycle of births, deaths, and rebirths is especially pronounced in the evening farewell and morning awakening of the bear. At the end of the XIX century N.L. Gondatti stated that "The festivities last at least three days, if the killed is a young bear, four - if the female, five - if the male", but if there are enough supplies, "they often celebrate up to twelve nights" [5: 64]. Currently, the duration of the holiday is four days/nights for the female, five days/nights for the male and three days/nights for the pestle or bear cub. The end of each festive night is marked by the performance of a farewell song [for the night]. The morning song is sung every morning; based on the content, it is the "awakening [of the beast] song", where the bear is addressed as a "newborn animal." Every evening the skin is carefully covered with a large scarf [like a shroud], and in the morning it is opened. From which it follows that the bear (object) makes a daily journey: temporary death - birth - temporary death. In the notions of

temporary death, the path of rebirth in a new quality (or form) is laid, here we have the rudiments of male hunting initiations that existed among the Mansi in ancient times. They are partially saved in the script of the holiday in its dramatic part, where scenes are performed. Actors perform with a face covered with a birch bark mask. They enter the house where the spirit dwells (in the form of a bear) and should not be recognized by him. At the same time, they have to cross the threshold every time, i.e. cross the border from one world to another and back. All scenes have the same ending, when the actor falls dead on the floor and lies motionless for some time. To the accompaniment of the appropriate melody, he gradually begins to move one by one: arms, legs, head, after which he begins to rise, performs a dance and leaves. Here the state of temporary death is staged, so the mask on the actor's face can also symbolize a funeral mask. There are changes in the perception of some dramatic performances, the meaning of which remains incomprehensible to the modern public. These are, for example, scenes where various parts of the human body are cut, separated and fall off. It is also incomprehensible the moments when the artists behave disrespectfully in the presence of spirits, can make indecent and offensive remarks in their address. Meanwhile, dramatic performances of this kind, to some extent, are transformed and abbreviated versions of the initiation rite. Currently, they are referred to as "black humor".

At the very end of the holiday, in the morning, when people are already tired and want to sleep, a man in a mask comes, his task is to smear the faces of the spectators who have fallen asleep with soot. Sleep is a state of temporary death, since during sleep one of the four/five souls of a person detaches from the body and travels. According to the religious beliefs of the Mansi, one cannot sleep in the presence of a spirit. A spirit dwelling here, in this case a bear, can "take" a person's soul, and he can no longer wake up. Covering the face with soot can mean applying a mask to make a person invisible [i.e. he is supposedly dead and he is not in the human world] and thereby protect him from the influence of supernatural forces.

Part of the dramatic performances is the puppet theater. Ritual actions associated with transitional moments in the lives of young men and women are transferred to the dolls. For example, two dolls that are lost in the forest, they are allegedly kidnapped by a bear, which clearly shows the situation of leaving the developed territory into the forest, which is a mandatory attribute of initiation rites. Or, for example, two dolls - a boy and a girl quarrel, then show a bloody knife and say that a murder allegedly took place here. In fact, the attributes of initiation are reproduced here: temporary death; blood - as a symbol of the "closure" of the past state; wounds - intended

to receive marks and scars as signs of the passed initiation; rebirth, etc.

In the traditional Mansi bear holiday, the role of such classic attributes of male hunting initiations as "big house" and "small hut" is clearly defined. In the first, all those present at the holiday receive a certain body of knowledge, in the second, the action of reincarnation takes place. According to custom, the holiday is held in a special cult house, it is called the "big [holy] house", which is always present in every settlement. All preparatory activities for entering this house of masks with dramatic performances (scenes) are strictly carried out in a separate room outside the house. For this, usually, for the duration of the holiday, a chum (traditional mobile dwelling) is erected next to the "big house" or some suitable outbuilding is built up, which during the holidays will be a "small house", or the so-called "male house". Here, men make the attributes necessary for the scenes (masks, staves, bows, arrows), equip the props, discuss the sequence of the masks, change clothes, etc. Only male actors and initiates (in this case, actors) young men have the right to enter this room. The rest of the population is strictly prohibited from entering. they must be unaware of how the mystery of reincarnation takes place in this or that character and who is hiding under the mask. The chum and the outbuildings symbolizing the "small hut" - are the realities of this time. In the distant past, perhaps, it was built from plates of birch bark (birch bark house), which is more consistent with the idea of death and rebirth.

The main and innermost part of the age-related initiations of young men are the initiations that reveal the sacraments to the neophytes. They sanctify any ritual action, the need to go through the pain of trials is connected with them in one way or another, and it is they who ultimately give the right to a new social status [6, 31]. At the end of the tests, the young men receive a new name "man-beast" (literally, having the strength of the beast), where the word "beast" enhances the significance of age - not a weak young man, but a mature man, who also received sacred knowledge. Also, a bear, who arrived at the holiday as a baby in a cradle, by the end of it becomes an adult, a hardened animal and is "escorted" to heaven, its former mythological habitat. But it acquired not only physical strength, but also spiritual knowledge, and together with it for four or five holidays, all the participants of the holiday received a certain set of sacred knowledge. Thus, the transmission of traditional knowledge from generation to generation takes place.

From the analysis of the Mansi bear holiday, it follows that it reflects the rituals of the human life cycle: funeral, maternity, age initiation, designed to help a person in the transitional moments of his life, to protect him from the influence of supernatural forces. At the same time, the bear ritual (cycle of

rituals) affirms the system of values accepted in a given society, sanctions and supports the corresponding norms of behavior, i.e. serves as a regulating program of an individual's behavior throughout his life. Explains the existing order and sets up team members to maintain that order.

References

1. Popova S.A. Rites of passage in the traditional culture of Mansi. Tomsk: Publishing house of Tomsk un-ty, 2003. 180 P.
2. Chernetsov V. N. Bear holiday among the Ob Ugrians / Transl. from Germ. and the publication by N.V. Lukina. – Tomsk: Publishing house of Tomsk un-ty, 2001. – 49 P.
3. Kannisto A. On the bear rituals of the Voguls // Mansi songs about the Bear recorded by Arthur Kannisto / comp. and transl. from Germ. lang. by N.V. Lukina. – Tomsk; Khanty-Mansiysk: Publishing house of Tomsk un-ty, 2016. – P. 11–31.
4. Eliade M. Sacred and secular. M.: Publishing house of MSU, 1994. 144 P.
5. Gondatti N.L. The cult of the bear among the small peoples of North-Western Siberia. SPb., 1888a. V. 48. Iss. 2. – P. 61–90.
6. Tendryakova M.V. Male and female age-related initiations (a variant of the problem statement) // Ethnographic Review, 1992. № 4. P. 29-41.

FEATURES OF COGNITIVE AND PERSONALITY DEFICITS IN OPIUM ADDICTS AT THE STAGE OF ONE-YEAR REMISSION

Lazarev Igor Aleksandrovich

Candidate of Medical Sciences, chief physician

Clinic of Dr. Lazarev

Saint Petersburg - Moscow

Tsvetkov Andrey Vladimirovich

Doctor of Psychological Sciences, Scientific Director

Neuropsychology Center "Izuminka"

Moscow, Russia

Abstract. *On the basis of psychopathological interviews and psychological testing of patients with opium addiction in remission (from a year or more), it was shown that the average productivity of their memory, thinking and attention is generally in line with the norm. At the same time, the personality has changes in emotions, volitional sphere and reflection. Presumably, it is reflection, that is, thinking directed at oneself, that should become in the future an indicator of a stable deficit of the personality and cognitive sphere, which is important for rehabilitation.*

Keywords: *opium addiction, remission, cognitive and personality deficits.*

The relevance of research

A mental defect is a kind of terra incognita in psychiatry and narcology. Especially in narcology. On the one hand, the classics describe in detail the changes in the psyche as one moves from "use with harmful consequences" to addiction and further, to its terminal stage.

The observations of practicing doctors and medical psychologists in most cases fit into the framework of classical data. But on the other hand, there is the position of V.D. Mendeleevich [6], who distinguishes neurological changes and the resulting cognitive and personality deficits with a "purely behavioral" disorder, which he considers psychoactive substance abuse (PAS). And unambiguous, statistically reliable data opposing this position cannot be found in the literature.

At the same time, the problem of a defect cannot be called purely theo-

retical. Treatment and rehabilitation of patients according to the most common algorithms (12-step program and its variations) appeal to their awareness of their condition as painful. And this, in turn, requires intact thinking and voluntary regulation of behavior.

Many times, various authors have noted the low efficiency of the methods and models of treatment used in narcology, with an average percentage of long-term remissions from 3% to 7%.

In the narcological literature, you can often find the term "addictive behavior", interpreted by Ts.P. Korolenko and N.V. Dmitrieva [5] as one of the forms of self-destruction, which consists in moving away from real problem solving to an illusory one. B.S. wrote about this. Bratus [1], who used the term "illusory-compensatory activity" in the analysis of mental changes in chronic alcoholics.

In general, as E.A. Brune writes (cited from [2]), psychopathological phenomena of "emasculatation" and "desolation", reminiscent of a schizophrenic defect, lie at the heart of the personality disorders of a drug addict, without reference to the type of substance consumed. The development of a mental defect follows the line "violation of the semantic sphere of the personality - a decrease in the productivity of cognitive processes - a narrowing of the spectrum of adaptation strategies" with a spiral development.

Note that the issues of "voluntariness" of treatment are resolved outside the perimeter of the clinic, in the interaction of a patient and a relative, or by a court decision. According to Russian law, a patient can refuse to continue treatment at any time. And his responsibility for being included in a working alliance with a doctor and paramedical personnel (psychologists, social workers, etc.) is determined by the paid nature of the assistance received.

Therefore, the concept of "defect", which is classical for psychiatry, turns out to be heuristically significant.

Firstly, it becomes possible to compare the state of a narcological patient with data on patients with other nosologies, for whom the circumstances of desocialization and personality degradation are well studied (schizophrenia, bipolar disorder, dementia).

Secondly, "defect" speaks of the state of the personality and cognitive processes achieved objectively by the present moment. This condition largely limits the possibilities for psychosocial rehabilitation.

Thirdly, a doctor in a private clinic is not concerned with rehabilitation in its entire duration, but with recommendations for treatment and ways of communicating them to the patient "here and now", to which the concept of "defect" corresponds much more.

Thus, *the relevance of this work is determined by the lack of concise,*

conceptually clear tools available for conducting and evaluating by an ordinary doctor in the field conditions that allow to build work with a patient with addiction and his family. In this case, "work" means the presentation of recommendations for further treatment and rehabilitation, taking into account the patient's capabilities to understand and follow them.

Subject of the study were psychopathological disorders observed in patients with opioid (heroin) drug addiction with abstinence from drug use for more than 1 year.

The main materials of the study were: an outpatient card; standard forms of psychological research protocols.

As part of the work, 69 patients with opioid dependence and treated in the outpatient rehabilitation department of the Moscow Scientific and Practical Center (MSPC) of Narcology in 2012-2013 were examined.

The study group was divided into 4 subgroups:

- the first subgroup included opium addicts with a remission period of more than 1 year, who are members of the community of drug addicts Anonymous (n=30);

- the second subgroup included opium addicts with a remission period of more than 1 year, who are adherents of religious rehabilitation centers (Baptists, etc.) (n=16);

- the third subgroup included opium addicts with remission of more than 1 year, not involved in any rehabilitation programs, occasionally consuming alcohol (n=14);

- the fourth subgroup included opium addicts with remission of more than 1 year, with spontaneous remission (n = 9).

A control group was also recruited, consisting of healthy people without signs of dependence (n=20). The age composition and educational level of persons from the control group were comparable with similar criteria for persons from the study group. *All test subjects were men.* The average age of the subjects was 29.5 years.

The criteria for enrolling patients in the study corresponded to the diagnostic categories of the International Classification of Diseases 10 revision (1994) and included dependence syndrome as a result of opioid use (F11.2), drug use experience of at least 5 years (average 7.5). Remission (confirmed immunochemically) at the time of examination at least 1 year.

The exclusion criteria from the study were:

- mental retardation;
- endogenous mental illness;
- an established diagnosis of a specific disorder of a mature personality;

- severe organic brain damage of non-narcotic etiology;
- decompensation of chronic somatic diseases;
- the combined use of drugs and psychoactive substances.

The main methods used in the work were clinical and psychopathological analysis of patient survey data and experimental psychological analysis (method of memorizing 10 words according to A.R. Luria, serial counting according to E.Krepelin, methods of "counting", "finding numbers", "pictograms", Verbal test by G. Aysenck).

The study was approved by the MSPC addictions ethics committee.

The **analysis of results** in patients of all subgroups revealed certain specific psychopathological disorders in the emotional, volitional and ideational spheres.

In the emotional sphere, the following were revealed: flattening of affect, a decrease in the feeling of empathy, anhedonia.

The flattening of affect was expressed in an extremely narrow range of emotions, scarcity of facial expressions, "unnatural emotions." The patients remained cold and indifferent towards their family, friends, people around them, work or study, did not feel affection for loved ones, practically did not take an interest in their cultural environment and emotionally significant experiences for them in the past.

Anhedonia manifested itself as a feeling of "inner emptiness", the impossibility of enjoying life. Many patients who have been in remission from 12 to 24 months, besides attending meetings of Narcotics Anonymous, are not busy with anything else in their lives. It should be noted that these symptoms could be combined with each other.

Table 1. Emotional disorders

	Flattening of affect	Empathic dissociation	Anhedonia
Group 1 (n=30) (narcotics anonymous)	21 (70%)	24 (80%)	6 (20%)
Group 2 (n=16) (religious rehabilitation)	12 (75%)	14 (87,5%)	2(12,5%)
Group 3 (n=14) (occasional alcohol use)	7 (50%)	6 (42,8%)	8 (57,14%)
4 group (n=9) (spontaneous remission)	5 (55.5%)	4 (44.4%)	6 (66.6%)
Control	0	0	0

In the volitional sphere all examined patients of groups 1 and 2 were found to have "addictive parabulia", which manifested itself in a combination of super-volitional behavior in relation to everything related to the drug

and abulia in relation to everything else. Since the moment of going into remission and joining the movement of Narcotics Anonymous (NA), the drug addiction parabulia in patients did not disappear, but changed. Their previously overvalued attitude toward drug use turned into an overvalued attitude toward the NA movement or religious activity. At the same time, all other volitional activity remained, as before, reduced. In patients of groups 3 and 4, hypobulia prevailed, manifested in a general decrease in the impulses to activity, passivity, and a narrowing of the range of interests.

Table 2. Volitional violations

	Parabulia	Hypobulia
Group 1 (narcotics anonymous)	27 (90%)	0
Group 2 (religious rehabilitation)	16 (100%)	0
Group 2 (occasional alcohol use)	0	8 (57,14%)
Group 4 (spontaneous remission)	0	6 (66,6%)
Control	0	0

In the ideational sphere (reflection and thinking, directed at oneself and the disease), overvalued ideas related to drugs were revealed.

While the patients were in active use, the content of such ideas concerned the drug-addicted way of life and the perception of the world, attributing magical, healing, mystical and other properties to the drug.

From the moment of going into remission with parallel introduction to the NA-community, the overvalue underwent inversion. Patients began to actively deny the previously declared positive properties of the drug. They also became overly categorical, did not even try to analyze their previous experiences and circumstances of use. This also manifested itself in excessive facial and vegetative reactions. Regardless of the period of remission, the attitudes and judgments of the patients remained extremely rigid and little accessible to change through persuasion.

In the case of patients who underwent religious rehabilitation, the plot of overvalued ideas had a different form and concerned total involvement in Bible study, missionary work, etc. Such patients lived in the communities and followed the “wards” with a shorter period of remission around the clock.

It should be noted that in some patients, overvalued ideas were of an individual nature, and were associated with stressful situations in life. More often this concerned patients from the group with spontaneous remission.

Table 3. Ideatorial violations

	Overvalued ideas
Group 1 (Narcotics Anonymous)	24 (80%)
Group 2 (religious rehabilitation)	16 (100%)
Group 3 (episodic alcohol consumption)	4 (28,6%)
Group 4 (spontaneous remission)	5 (55,6%)
Control	2 (10%)

With the help of experimental psychological methods, the examined patients with opioid dependence and remission for more than a year *did not reveal gross violations of the intellectual-mnemonic sphere* and attention disorders. Indirect memorization was not impaired, standard ordered images predominated in pictograms. As a result of the techniques of "counting according to Kraepelin," "counting" and "finding numbers", we can say that attention is sufficiently stable, without significant fluctuations, concentration and switchability are sufficient. Selectivity of attention is sufficient. The intelligence quotient according to G. Eysenck's verbal test on average in the group is 105, which does not go beyond the norm.

It can be assumed that memory and attention disorders, which are described in the acute period and in the first months of remission, are apparently associated with a general disorganization of mental activity with an exacerbation of pathological drive and asthenic phenomena.

On the other hand, there is data from E.A. Bruna, A.V. Tsvetkova and A.A. Shuvalova [3] about persons with a history of cannabinoid use, standing on the so-called. "Dispensary" registration of state narcological dispensaries (ie consumption with harmful consequences, but not yet addiction syndrome). On the overlapping array of experimental psychological techniques, the authors showed that *while maintaining the overall productivity of cognitive activity in patients, interfunctional integration decreases*.

Moreover, the main vector is a decrease in the correlation of productivity of memory, thinking and attention with voluntary regulation. In other words, there is a "switch" of control from the frontal-postcentral cortical connections to the diencephalic-cortical with compensation for the deficit by involuntary implementation of the techniques.

It is known that opioid alkaloids block the cough and, in part, the respiratory centers of the medulla oblongata. It was also shown that due to this, with prolonged use of these substances, diffuse hypoxic-ischemic brain damage develops. The most vulnerable, due to the peculiarities of the organization of cerebral circulation, are the basal ganglia and subcortical white matter. In this case, the bundles of fibers from the basal ganglia are

thicker than the intercortical connections. Also, intercortical connections need "toning" (selective tonic activation) and modulation from the basal ganglia. All this, taken together, influences the transfer of mental activity to a less arbitrary level, regulated by subcortical structures.

Conclusions

The issue of trigger mechanisms and the role of each of the subject's sides (cognitive and motivational) in the overall growth of the defect, apparently, does not have a single solution.

Firstly, if the relationship of the patient's cognitive and personal-motivational spheres is complex and dynamic, then the mechanism of "conversion" of thinking and self-knowledge, self-understanding, as V.V. Signs [4]. It is these mechanisms that can underlie the assessment of the severity of the defect in the "psyche as a whole".

Secondly, the comparative preservation of the cognitive sphere with rather gross distortions of the personality, its emotions and arbitrary regulation raises the question of addictive behavior as a negative adaptation option. The same goes for the search for such components of cognitive processes, which clearly indicate the violation of their integration. It can be assumed that such a component is the "understanding" of problem situations, especially when it is necessary to transfer information from verbal to picture form and back.

Thirdly, the obtained data show the validity of the position [6] regarding the rather late, over 5 (in some sources - 10) years of opioid use, the formation of an irreversible deficit in cognitive processes. It is also impossible to reject the likelihood that the cognitive deficit noted in practice at the later stages of addiction development is secondary and is caused by gross violations of the arbitrariness of behavior and the motivational sphere of the individual.

References

1. Bratus B.S. Personality anomalies. – M.: Thought, 1988. – 301 P.
2. Brune E.A., Tsvetkov A.V. Practical Psychology of Addiction. – M.: Science, 2014. – 296 P.
3. Brune E.A., Tsvetkov A.V., Shuvalova A.A. Features of higher mental functions in persons using cannabinoids // Theory and practice of social development. – Krasnodar: Horse, 2014. №19. – P. 247-250.

4. Znakov V.V. Thinking, self-awareness, self-understanding // Bulletin of the Moscow un-ty – Ser. 14. Psychology. – 2008. – № 2. – P. 74-86.
5. Korolenko Ts.P., Dmitrieva N.V. Psychosocial Addictology. – Novosibirsk: Publishing house "Olsib", 2001. – 251 P.
6. Mendelevich V.D. Psychopathologization of narcological disorders as the dominant paradigm of Russian narcology // Independent Psychiatric Journal. - 2010. - № 3. - P. 21-27.

FEATURES OF THE STRUCTURE OF DENTAL HARD TISSUES IN A REGION WITH AN INCREASED LEVEL OF FLUORIDE IN DRINKING WATER

Petrushanko Vladymyr Nykolayevych

Candidate of Medical Sciences, Associate Professor

Lobach Larysa Nykolaevna

Master of Medical Sciences, Assistant

Lyashenko Liliya Ivanovna

Candidate of Medical Sciences, Assistant

Ukrainian Medical Dental Academy

Abstract. *The problem of diagnostics and treatment of caries, its complications, non-cariou lesions remains relevant in dentistry. The development and use of new techniques for the treatment of hard tissue lesions requires deep knowledge of the structure of dental tissues, especially in regions with different contents of trace elements in water and food.*

In the Poltava region, there is a high content of fluorine in drinking water, and this leads to the occurrence of fluorosis. The increased concentration of fluoride causes its rapid accumulation in the organs of the oral cavity, and as a consequence - the transformation, and further imbalance of microelements in the organs of the oral cavity.

Keywords: *enamel, dentin, hydroxyapatite, fluorine, calcium, adhesive.*

Apatite crystals form the basis of tooth enamel. 75% hydroxyapatite, 19% carbon apatite, 4.4% chlorine apatite, 0.66% fluorapatite. When the amount of trace elements changes, isomorphous substitution occurs and the composition of the "ideal" hydroxyapatite ($\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$) changes, this is a very unfavorable factor for the onset and development of the carious process. The microelement composition of enamel and dentin during a person's life undergoes the processes of demineralization (release of mineral substances) and remineralization (re-entry of mineral substances), which are balanced under physiological conditions [1,2]. The quantitative composition of trace elements is not constant and changes under the influence of various factors. J. M. Navia (1972) classified chemical elements into 5 groups:

1. Caries-static elements: fluorine, phosphorus. 2. Moderately caries-static elements: molybdenum, vanadium, copper, boron, lithium, gold. 3. Doubtful elements: beryllium, cobalt, manganese, tin, zinc, bromine, iodine. 4. Caries - inert elements: barium, aluminum, nickel, iron, palladium, titanium. 5. Caries - favorable elements: selenium, magnesium, cadmium, platinum, lead, silicon. Fluorine plays a major role in providing enamel resistance to acids. It can be chemically bound in the composition of hard tissues in the form of fluorapatite, fluorohydroxyapatite (stable fluoride), or calcium fluoride (labile fluorine). It can also form a depot on the enamel surface or in the pores. In the surface layers of the enamel, the concentration of fluorides is quite high and ranges from 500 to 4000 mg/kg, and in the deep layers from 50 to 100 mg/kg. The concentration of fluorides in dentin is in the range of 200-1500 mg/kg and increases in the area of primary carious damage. Fluorine forms a complex with calcium ions, which is removed from the body and this leads to a violation of the mineralization of the teeth. The inclusion of certain elements in the crystal lattice of hydroxyapatite changes the mineral structure of the enamel [3,4]. The criterion for maintaining the crystal lattice of hydroxyapatite is the Ca/P ratio in the range of 1.33-2.0. When the ratio drops below 1.33, the crystal lattice is destroyed. For the treatment of defects in hard tissues of teeth when using filling materials, it is important to know the structure of enamel and dentin, because this will determine how much the material will be adapted to the tissues of the tooth. Even modern adhesive systems are not always able to form a strong bond with hard tissues, especially with fluorosis.

The purpose of this work was to study changes in enamel and dentin during caries and increased abrasion of hard tissues in a region with a high fluoride content in drinking water.

Materials and methods

The studies were carried out using a scanning electron microscope (SEM) "Mira 3 LMU" ("Tescan", Czech Republic) with a maximum resolution of 1 nm and a maximum magnification of 1,000,000 b and an energy dispersive spectrometer "X-max 80mm2" ("Oxford Instruments"), which was integrated at a scanning electron microscope. The studies were carried out on the basis of the Paton Institute, department of nanomedical technology (Kiev).

The study included 40 teeth removed for surgical indications from residents of Poltava (the fluoride content in drinking water is 1.5-1.8 mg/l.) With a carious process against the background of physiological abrasion (20 teeth), with increased wear and tear and a carious process (20 teeth). To solve the set tasks, the enamel and dentin of the teeth were examined. The

proposed research system made it possible to determine the microstructure of enamel and dentin without the traditional procedure for dielectric samples of coating the surface with a thin layer of conductive material (C, Au, Pt). Preventing surface charging was made possible by a significant reduction in the probe current and the high sensitivity of the detectors. The refusal to spray the surface with the leading material made it possible to avoid possible distortion of the research results.

To analyze and compare the structure, composition and characteristics of the samples, an algorithm for their assessment was developed, which is the same for all samples that were studied.

The technique included: study of the structure of enamel prisms and the size of the interprismal space, study of dentinal tubules, and the zone of intertubular dentin, microanalysis and elemental analysis in selected areas of enamel and dentin to study their relationship. Chips of enamel and dentine can pass in different directions and at different angles, which leads to a change in the perception of both the size of the structural units of enamel and dentin and the spaces between them. Therefore, to resolve the issue of the features of the morphology of enamel and dentin, the technique proposed by I.M. Tkachenko (2011) was used [7,8].

When examining hard tissues of teeth, a series of digital images of enamel with different degrees of magnification were obtained to assess morphological features. According to the scale mark, the number of enamel prisms and dentinal tubules was counted on each of the images and their number was converted to 100 μm . Then the average value of enamel prisms and dentinal tubules per 100 μm was calculated for each cleavage of the tooth that was studied, and these data were entered for analysis in the summary table. The number of prisms per unit area was characterized by the density of the enamel, on which, as noted earlier, the permeability, hardness, resistance of tissues to fracture, bending, cleavage, and elastic modulus depend.

Results of the study

Our studies have shown the following results. When studying the correlations of the morphological structure and chemical composition in groups of teeth with caries and increased wear and tear, it should be noted that in the group of teeth that have a carious process, there is a direct correlation between the number of enamel prisms with the intervals between them, the intervals between the enamel prisms correlate with the amount of carbon (with $p=0.03$), the amount of oxygen directly correlates with the amount of sodium (at $p=0.01$) and has an inverse relationship with the amount of phosphorus (at $p=0.003$) and the amount of calcium (at $p=0.0001$), phosphorus and calcium have a direct strong connection with each other, from these ele-

ments, in most cases, the resistance of hard tissues depends. Magnesium correlates directly with carbon levels (at $p=0.02$). The amount of fluorine in the affected area in the upper layers is from 0.2 to 0.6%.

In the study and analysis of the microelement composition of dentin, feedback was established between the amount of intertubular dentin and the level of carbon (at $p=0.02$), the diameter of the dentinal tubules with the level of phosphorus and the amount per unit area has a direct force of correlation. In dentin, there is a strong relationship between carbon and magnesium levels. Magnesium has a significant effect on the structure of dental hard tissues. It plays a key role in regulating the growth of hydroxyapatite crystals. Also, with systemic use, magnesium ions reduce the toxic effect of fluoride and the degree of clinical manifestations of fluorosis.

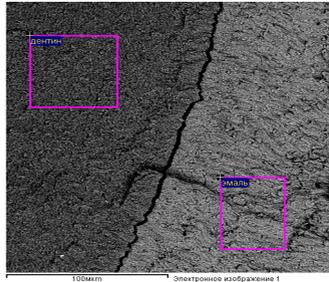


Fig. 1. General view of the studied areas of enamel and dentin with the established study areas of the microelement composition.

When assessing the state of enamel and dentin of teeth with increased wear and tear, we note the following: the number of enamel prisms has a direct correlation with oxygen (at $p=0.03$), carbon has a strong feedback with the calcium content in the enamel at (at $p=0.0004$), calcium, as well as in teeth with a carious process, has a strong connection with the level of phosphorus (at $p=0.0001$), the level of which, in turn, depends on the amount of chloride compounds in the enamel. Also, the amount of magnesium has a strong relationship with the amount of sodium, which was not observed in teeth with carious process.

Having carried out a study of the chemical composition of enamel and dentin of teeth with a carious process and increased abrasion, when considering the morphology of enamel, a direct type of correlation between the number of prisms and the number of gaps is noted (at $p=0.001$). The spaces between the prisms are inversely related to the amount of magnesium at ($p=0.025$) at the enamel-equator (under the surface) and enamel-tubercle (under the surface) (at $p=0.037$). That is, the larger the gaps between the

prisms, the less magnesium in the enamel, which in turn will affect the enamel resistance. The intervals between the prisms also have an inverse correlation with the amount of phosphorus and carbon ($p=0.001$). The amount of carbon in the enamel has a direct type of correlation with phosphorus and magnesium (at $p=0.001$). The amount of oxygen has a direct relationship with calcium and phosphorus ($p=0.0001$), which have a direct type of correlation. In the study of dentin, the diameter of dentinal tubules has a direct type of correlation with the amount of phosphorus ($p=0.002$), the amount of intertubular dentin depends on the amount of carbon, which has a strong relationship ($p=0.0001$) with the amount of magnesium. When examining enamel in teeth with increased wear and tear, we note a direct dependence of the number of enamel prisms on the amount of oxygen at ($p=0.003$). Calcium has a direct type of correlation with oxygen at ($p=0.0004$), and magnesium directly correlates with the amount of sodium in the enamel. In the study of dentin, the volume of intertubular dentin is associated with the number of enamel prisms ($p=0.04$), and the diameter of dentinal tubules with the amount of calcium ($p=0.003$). The total number of enamel prisms and dentinal tubules is directly related to the amount of carbon at ($p=0.03$) and the amount of calcium ($p=0.0007$). Evaluating the differences in the indicators of teeth with increased wear and tear and with the presence of a carious process, we can note a significant difference in sodium, calcium in the enamel area and magnesium in the dentin area at ($p < 0.05$). Differences were also established in the area of enamel in the preparation area with a significant difference in magnesium between the two groups, at a distance of $5 \mu\text{m}$ from the preparation area (in the area of the smeared layer) differences in the amount of strontium, magnesium and carbon. In the area of dentin examination directly in the preparation zone, there are significant differences in the amount of silicon, magnesium and zinc.

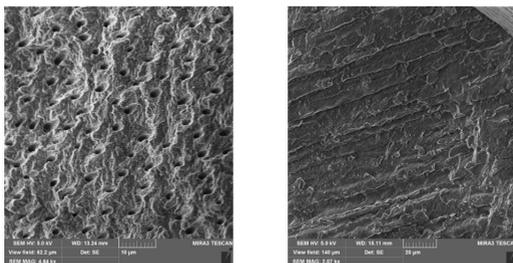


Fig. 2. The investigated areas of the cleavage (A - structure of dentin with increased abrasion, B - structure of enamel with increased abrasion. Magnification of samples in 9010x, scale mark-20 μm

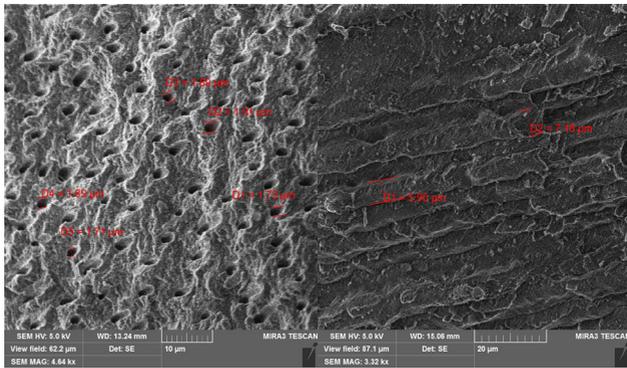


Fig. 3. A cut of a tooth with a diagnosis - increased abrasion with applied linear markings to determine the microelement composition.

Such changes affect the destruction of the crystal lattice of hydroxyapatite. Fluorine forms a complex with calcium ions, which is removed from the body, as a result of which there is a decrease in the amount of calcium salts and a violation of mineralization. Therefore, such changes must be taken into account both in preventive measures and in the treatment of hard tissue defects. The connections of adhesive systems at different degrees of mineralization will also be different and this must be taken into account when choosing an adhesive system. Given the significant concentration of fluoride in the Poltava region, there are areas of enamel decay in the teeth, with areas of amorphous structure, and therefore, for better fixation, it is necessary to use filled adhesive systems that can better integrate into the areas of decay and thus firmly fix the filling material. To reduce the toxic effect of fluoride, it is necessary to systematically apply magnesium ions, which can be included both in toothpastes and rinses, and in vitamin complexes. Interacting in the small intestine, magnesium reduces the absorption of fluoride, and hence its toxic effect.

References

1. Gasyuk P.A. Histostucture of the enamel-dentin border of the cervical region of teeth with superficial and medium caries / P.A. Gasyuk, V., Pudyak, S.M. Pridruga // Ukrainian Dental Almanac. - 2012. - № 3. - P. 4-6.

2. Zabuga Yu.I. Structural features of enamel and dentine of human teeth in the age aspect / Yu. I. Zabuga, V.I. Struk, A.V. Beda // Achievements of biology and medicine. - 2012. - № 2. - P. 43-46.
3. Korol M.D. Features of the study of density and structural features of enamel with increased and physiological abrasion of teeth / N.D. Korol, I.M. Tkachenko // Ukrainian Dental Almanac. – 2012. – №1. – P. 18-22.
4. Kostilenko Yu.P. Structural changes in dentin and enamel of permanent teeth with pathological abrasion / Yu.P. Kostilenko, N.M. Anoprieva // World of Medicine and Biology. - 2013. - № 1. - P. 23-25.
5. Legkikh A.V. Comparative assessment of the degree of mineralization of hard tissues of teeth by Raman spectroscopy / A.V. Legkikh, Yu.V. Mandra, D.V. Kiseleva // Ural Medical Journal. – 2015. – № 6. – P. 5-8.
6. Mandra Yu.V. Assessment of morphostructural changes with increased tooth wear according to optical electron and atomic force microscopy / Yu.V. Mandra, S.L. Votyakov, D.V. Kiseleva // Ural Medical Journal. - 2008. - № 10. - P. 27-29.
7. Tkachenko I.M. Investigation of correlations of morphological and microelement composition of tooth enamel with physiological wear / I.M. Tkachenko, N.M. Skorik // Bulletin of problems of biology and medicine. - Poltava, 2012. – Iss. 2, V. 2 (93). – P. 256-260.
8. Tkachenko I.M. Structural features of enamel with increased and physiological abrasion of teeth / I. M. Tkachenko, N.M. Skoryk // Ukrainian Dental Almanac. – 2011. – №6. – P. 15-21.
9. A radiopaque zirconia microfiller for translucent composite restoratives / [Furmann B. R., Nicoletta D., Wellinghof S. T. and etc.]- J. Dent. Res. - 2000. - №79. – 246 p.
10. Andujar M. B. Collagen gene expression and tooth development / M. B. Andujar, H. Magloire // Anoverview. J. de Biologie Buccale. - 1990. - Vol. 18, №2 - P. 117 - 122.
11. Apkarian R. P. High resolution SE-I SEM study of enamel morphology, / R. P. Apkarian, M. D. Gutelcunst, D. Joy S. // J. Electron Microscopy Technique 1990. - №14. – P. 70 - 78.
12. Bres E. F. High resolution electron microscopy of human enamel crystals / E. F. Bres, J. C. Voegel, M. R. Frank // J. Microscopy, 1990. - №160. - P. 183-201.

DOI 10.34660/INF.2020.87.40.025

ANTI-RITUXIMAB ANTIBODIES IN PATIENTS WITH CHRONIC LYMPHOCYTIC LEUKEMIA

Moskalets Oxana Vladimirovna

Candidate of Medical Sciences

Moscow Regional Research Clinical Institute named after M.F.Vladimirkij

Abstract. *Rituximab, a chimeric monoclonal antibody targeted against the pan-B-cell marker CD20, is widely used for treatment of lymphomas, rheumatologic diseases and other disorders. It is known that many monoclonal antibodies such as rituximab can elicit anti-drug antibodies, which may interfere with therapeutic response. The aim of this study was to investigate the incidence of antibodies to rituximab in patients with chronic lymphocytic leukemia. Serum concentrations of anti-rituximab antibodies was determined in blood serum of patients with B-chronic lymphocytic leukemia (newly diagnosed and resistant / recurrent forms, previously treated by rituximab) and healthy controls. Results: none of the patients with newly diagnosed disease have antibodies to rituximab. Positive results were recorded in 8 (33%) patients who received rituximab earlier.*

Keywords: *rituximab, anti-drug antibody, chronic lymphocytic leukemia.*

Introduction

Currently, genetically engineered drugs are widely used to treat hemoblastosis and autoimmune diseases [1,2]. Because of their higher target specificity, monoclonal antibodies treatments are generally considered to pose a lower risk of adverse reactions than chemical drugs. Rituximab, a chimeric monoclonal antibody targeted against the pan-B-cell marker CD20, was the first monoclonal antibody to be approved for therapeutic use [2]. It is usually used in combination with chemotherapy. Treatment with rituximab at standard weekly dosing is effective in more than 50% of patients with relapsed or refractory CD20-positive follicular non-Hodgkin's lymphoma, but is not curative. It is less effective in other subtypes of CD20-positive lymphoma and for retreatment, even with CD20 still expressed [3]. Thus, binding of rituximab to CD20 is not sufficient to kill many lymphoma cells, indicating that there are mechanisms of resistance. Mechanisms of cell destruction that have been demonstrated to be activated by rituximab

binding to CD20 include direct signaling of apoptosis, complement activation and cell-mediated cytotoxicity [1]. The relative importance of each of these mechanisms in determining clinical response to rituximab treatment remains a matter of conjecture. Thus, the role of various resistance pathways, some documented in experimental systems and others still hypothetical, remains uncertain. Resistance could potentially be mediated by alterations in CD20 expression or signaling, elevated apoptotic threshold, modulation of complement activity or diminished cellular cytotoxicity [1]. Besides, immunogenicity, in particular the induction of anti-drug antibodies (ADAs), is an important concern, and thus immunogenicity assessment is a requirement for their approval. [4] The literature actively discusses the issue of the lack of efficacy of rituximab in some patients due to ADAs [5-7].

The aim of this pilot study was to investigate the incidence of antibodies to rituximab in patients with chronic lymphocytic leukemia.

Materials and methods

The study involved 36 patients with B-chronic lymphocytic leukemia (B-CLL) (12 newly diagnosed, 24 - resistant / recurrent form), aged from 35 to 68 years (average age 49,7 years), of which 21 women and 15 men and 12 practically healthy individuals, matched by age and sex.

In 60% of patients, stage 2 of the disease was detected, in 40% of patients - stages 3 and 4. Patients with refractory / relapsing forms have previously received 4-6 courses of R-FC therapy. Determination of antibodies to rituximab in peripheral blood serum was performed by enzyme-linked immunoassay using a test system manufactured by Bender Medsystems (Austria) (semi-quantitative analysis).

Results

Below is a table with the results obtained.

Table 1. The presence of antibodies to rituximab in the blood serum of patients with B-CLL and healthy donors.

Group	Result (conventional unit) *
Newly diagnosed B-CLL (n=12)	1,45
	0,63
	1,84
	1,0
	1,27
	1,5
	1,22
	1,57
	2,43
	2,16
	1,34
	1,5
	2,31
	2,68
	2,5
	2,27
	2,29
2,34	
0,88	
1,07	
1,24	
127	
74,57	
Resistant/recurrent B-CLL (n=24)	2,35
	2,27
	9.61
	3.59
	5.98
	9,32
	6,87
	1,16
	0,84
	1,43
	1,14
0,77	
0,84	

Process Management and Scientific Developments

Group	Result (conventional unit) *
	1,77
	3,4
	0,95
	0,94
	0,81
	1,13
Controls (n=13)	0,59
	2,22
	5,18
	0,86
	1,72
	1,0
	0,77

*Note: positive results are shown in bold

As follows from the table, none of the patients with newly diagnosed disease have antibodies to rituximab. Positive results were recorded in 8 (33%) patients who received rituximab earlier. Of particular note is a patient with a very high antibody level (74,7 c.u.) who received 6 courses of combination therapy and showed pronounced progression of the disease. At the same, in the group of practically healthy individuals, positive results were obtained in 2 cases, in particular, with a procedural nurse who regularly contacts the drug.

Conclusion. Anti-rituximab antibodies were detected in every third patient with an unfavorable course of the disease. If we suppose that immunogenicity is an important factor that should be considered in the overall treatment strategy, we should take actions to reduce antidrug antibodies formation: modifying drug administration; increasing dose; decreasing immunogenicity by adding immunosuppressive agents to the regimen or using new drugs which are supposed to be less immunogenic such as humanized or fully human monoclonal antibodies.

References

1. Chan A.C., Carter R.T. Therapeutic antibodies for autoimmunity and inflammation. *Nat. Rev. Immunol.* 2009. Vol.10. P.301-316. Doi:10.1038/nri2761/
2. Smith M.R. Rituximab (monoclonal anti-CD20 antibody): mechanisms of action and resistance. *Oncogene.* 2003. Vol.22(47). p.7359-7368. Doi 10.1038/sjonc120639.
3. Maloney D.R. Anti-CD20 antibody therapy for B-cell lymphomas. *N Engl. J. Med.* 2012. Vol.316. P.2008-2018 Doi:10/1056/NEJMct1114348.
4. Rosenberg A.S., Sauna Z.E. Immunogenicity assessment during the development of protein therapeutics. *J. Pharm. Pharmacol.* 2017. Doi:10.1111/jphp12810.
5. Krishna M., Nadler S.G. Immunogenicity to biotherapeutics – the role of anti-drug immune complexes. *Front. Immunol.* 2016; 7:21 Doi: 10.3389/fimmu.2016.00021.
6. Tada M., Ishii-Watabe A., Suzuki T., Kawasaki N. Development and characterisation of an anti-rituximab monoclonal antibodies. *Mabs.* 2018. Vol.10(3). P.370-379. Doi: 10.1080/19420862.2018.1424610.
7. vanSchi K.A., Wolbink G.J., Respens T. Cross-reactive and pre-existing antibodies to therapeutic antibodies – Effects on treatment and immunogenicity. *Mabs.* 2015. Vol.7. 662-671. Doi:10.1080/19420862.2015.10481111.

THE BIOENGINEERING STRUCTURE FOR THE TREATMENT OF LIVER FAILURE

Sichkar D.A.

Researcher

Korotkov A.V.

Candidate of Medical Sciences, Associate Professor, Leading Researcher

Kostyukova S.V.

Candidate of Biological Sciences, Associate Professor, Leading Researcher

Evgeny Shuman

Researcher

Mariya Desyatova

Researcher

Satonkina O.A.

Candidate of Biological Sciences, Associate Professor, Leading Researcher

Makeev O.G.

Docotr of Medical Sciences, Full Professor, Chief Researcher

Ural State Medical University

Institute of Medical Cell Technologies of the Sverdlovsk Region

Abstract. *The goal of the study is to obtain convincing data on the effectiveness of the use of multipotent mesenchymal stromal cells (MMSCs) transfected with a plasmid vector with the hepatocyte growth factor gene (HGF), as well as spheroids from MMSCs transfected with the same vector (SFMSC).*

Morphological and morphometric studies were performed on Wistar rats (n = 54) 30 and 90 days after transplantation of a suspension of transfected MMSCs and cell spheroids. The results obtained were statistically processed.

Positive changes of the studied parameters in the dynamics of observation are shown. Thus, therapy with the suspension of transfected MMSCs and SFMSCs by the number of binuclear cells and the thickness of connective tissue septa significantly differed from the corresponding indices in the control group.

Keywords: *cirrhosis, multipotent mesenchymal stromal cells, transdifferentiation, gene therapy, hepatocyte growth factor*

Introduction

Liver failure and cirrhosis is a widespread pathology. So, in Russia, every fourth patient in a hospital (regardless of profile) has one or another degree of severity of liver failure. Every year up to one and a half thousand people are diagnosed with cirrhosis of the liver. In other countries, the incidence of this pathology is close to domestic Russian, and the mortality from liver cirrhosis is about 30 cases per 100,000 population [1]. An uncontested method of treating patients with the final stage of liver cirrhosis is liver transplantation. At the same time, the lack of donor organs remains a global problem. Thus, only one out of ten patients on the waiting list receives such assistance. And the number of those awaiting transplantation is steadily increasing [2]. In turn, the difficulties with the survivability of the transplanted organ and the duration of its delivery determine the graft survival rate within 65%. Therefore, a significant number of research teams are involved in the development of non-transplant methods of treatment for both failure of functions and cirrhosis of the liver, as an extreme degree of development of this pathology [3, 4]. Taking into account the physiological features of liver tissue regeneration, the lack of proven information about the existence of hepatic stem cells, as well as the involvement of almost all functionally preserved hepatocytes in the process of restoring the integrity of this organ, the possibility of stem cell transplantation attracts much attention. It is assumed that the cells injected will differentiate or transform (using stem cells from another germ layer) into cells of the liver tissue. Meanwhile, the proportion of transplanted cells undergoing reprogramming under natural conditions is extremely small and barely reaches tenths of a percent. Nevertheless, this approach is considered promising for the treatment of liver cirrhosis [5]. Thus, the aim of the work was to confirm the effectiveness of the developed tool, which provides for the use of reprogrammed multipotent mesenchymal stromal cells (MMSC) transfected with a plasmid vector with the hepatocyte growth factor (HGF) gene, as well as spheroids from MMSC transfected with the same vector (SMMSC).

Materials and methods

Linear laboratory rats (Wistar) $n = 54$ were used to evaluate the effect of transplantation of pre-differentiated MMSCs, as well as spheroids of these cells in cirrhotic liver injury. The work was carried out on the basis of approval of the study design by the local ethical committee of the Ural State Medical University of the Ministry of Health of the Russian Federation, as

well as being guided by the European Convention for the Protection of Vertebrate Animals (Strasbourg, 03/18/1986) and the Order of the Ministry of Health of the Russian Federation (199n, 04/01/2016).

To simulate liver damage in laboratory animals, a well-known technique was used that combines two approaches to the pathology of this organ. Rats were injected intraperitoneally with a 50% solution of carbon tetrachloride in vegetable oil at the rate of 0.25 ml of pure CCl₄ 2 times a week. In addition to carbon tetrachloride, a solution of thiocytamide 150 mg / kg per week was used. The latter provides an improved supply of carbon tetrachloride to hepatocytes. This method makes it possible to achieve a stable output of liver cirrhosis in almost 100% of experimental animals. According to the formation of liver cirrhosis, the administration was stopped and the animals were divided into 3 groups: two experimental and a control. To perform the cell therapy procedure, we used samples of adipose tissue from the inguinal girdle of intact rats due to the presence of the least differentiated and functionally active mesenchymal stem cells in this tissue [6]. The adipose tissue was collected under intravenous anesthesia. Isolation and cultivation of MMSC from adipose tissue was carried out according to the standard technique [7].

We used pBABE-puro (Addgene plasmid 176) as a vector base. Synthesis of DNA encoding HGF was carried out by reverse transcription using the RTS kit (Promega). PCR primers were designed using data and programs located on the NCBI website. Cells were removed from vials using 0.2% and 0.25% trypsin-Versene solution, respectively (Sigma Aldrich). The harvested cells were placed in 25 cm mattresses and cultured in an incubator at 5% CO₂ in DMEM / F12 medium with fetal bovine serum from 3 to 12%, which was determined by the degree of differentiation of the cell culture. At the initial stage, the cells were cultured with the addition of penicillin, streptomycin, and tylosin at "culture" concentrations. The medium was changed every 3 days.

Upon reaching 70% confluency, cells were transfected with pBABE-puro HGF (Addgene) using the Lipofectamine™ 2000 kit (Invitrogen) according to the manufacturer's protocol. After 24 hours, cells were washed from free plasmid vector and transfection medium.

Transfection made it possible to obtain cells with phenotypic characteristics of hepatocytes from multipotent mesenchymal stromal cells of adipose tissue.

Table 1. Study design

Experimental group	Group characteristics
Group 1 experimental group No. 1 (n = 18)	Upon completion of the modeling of liver cirrhosis, the rats continued intraperitoneal administration of physiological saline in an amount equivalent to the control for 6 days. On the 7th day, a single intraportal injection of a suspension of transfected MMSCs was carried out at the rate of $5 \cdot 10^6$ / kg of animal weight (10^6 cells for a 200-gram rat) in 0.5 ml of saline.
Group 2 experimental group No. 2 (n = 18)	Upon completion of the modeling of liver cirrhosis, the rats continued intraperitoneal administration of physiological saline in an amount equivalent to the control for 6 days. On day 7, a single intraportal injection of a suspension of spheroids from transfected MMSCs was carried out at the rate of $5 \cdot 10^6$ / kg of animal weight (10^6 cells for a 200-gram rat) in 0.5 ml of saline.
Group 3 control group (n = 18)	In animals, cirrhosis of the liver was simulated and saline solution (0.2 ml) was injected daily 6 times intraperitoneally and the seventh (0.5 ml) - intraportally. The animals did not receive any therapeutic effects. The results of the study of this group were used as an object of comparison with the animals of the experimental groups.

At the end of 30 and 90 days after the introduction of cells (or saline solution to a control group of animals), the animals were euthanized (by air embolism), which made it possible to study the relatively long-term results of therapy. To study the isolated liver, microscopic examination of the affected tissue [8] with hematoxylin-eosin staining was performed.

Morphometry was performed on an Olympus CX-41 microscope using a package of special programs in 10 fields of view with a magnification from 100 to 300 [9]. The number of two or more nuclear cells, the degree of dystrophic changes and the thickness of the connective tissue interlobar septa were investigated [10].

The results were processed using the Mann-Whitney, Kruskal-Wallis and Pearson xi-square tests. The calculations were performed using the STATISTICA 8.0 package. The results were considered significant at $p < 0.05$.

Results

The introduction of carbon tetrachloride and thioacetamide was accompanied by the occurrence of liver cirrhosis. The organ was visually enlarged, compacted, with rounded edges and tuberosity.

Among the typical signs observed in the liver with cirrhosis, there was the appearance of a rounded shape of unfilled cavities, edema, pigmentation, hyperemia of blood vessels, lysis of erythrocytes, as well as an

increase in the number of binuclear cells with signs of necrosis and dystrophy.

An important sign observed during microscopy is fibrosis of the liver tissue with the formation of false lobules due to the proliferation of connective tissue septa.

The average value of the thickness of the connective tissue septa in the 3rd group did not exceed 35.12 μm , in the 1st group - no more than 34.48 μm and in the 2nd group - 33.60 μm . No significant differences were found between the indicators of individual groups.

The average value of cellularity (binucleated / multinucleated cells, number in the field of view) in the 3rd control group was 12.0 (11.7 - 12.5), in the 1st group - 11.8 (11.3 - 12, 3) and in group 2 - 11.6 (11.4 - 11.8), which also did not allow finding statistical differences.

The assessment of the degree of development of signs of dystrophy after the reproduction of the cirrhotic liver model in all three studied groups also did not reveal significant statistical differences.

Histological analysis of liver samples 30 days after administration of transfected MMSCs in the experimental groups revealed statistically significant differences from the control group.

So, in the control group (group No. 3), the uniform arrangement of binuclear / multinucleated cells, the presence of a fibrosing process of stromal tissue, degenerative changes in hepatocytes were determined.

In group 1, histological studies revealed a number of two or more nuclear cells, proliferation of connective tissue formations, and the presence of false lobules/

In group 2 (with the introduction of SMMSC), after 30 days, a smaller number of two- or more nuclear cells, areas of moderate dystrophy and thinning of the intercellular and interlacunar connective tissue septa were found in the control group.

30 days after the administration of transfected MMSC / SMSCC, the mean value of the thickness of connective tissue septa in group 3 was 29.62 (28.8 - 30.7) μm , in group 1 (with the introduction of a suspension of transfected MMSC) - 22.18 (21 , 56 - 23.6) microns and in the 2nd group 19.9 (17.8 - 20.5).

In the control group, the significance of the differences with the experimental groups was confirmed ($p \leq 0.05$). Also, differences attributed to statistically significant were noted between the experimental groups.

Hepatocytic dystrophy in the 3rd (control) group was expressed in 4 animals and moderately expressed in 2; in the 1st group (with the introduction of a suspension of transfected MMSC) and slightly expressed in 3

rats; and in the 2nd group (with the introduction of SMMSC) dystrophy was observed in 2 rats and weakly in 4 rats.

Comparison of the control and experimental groups demonstrated the statistical significance of the differences. No other significant differences were found.

In the morphological and morphometric analysis of liver samples 90 days after the injection of transfected MMSC in the form of a suspension of cells or spheroids, the changes were identified as significant compared to the control.

So, the 3rd group was characterized by the presence of mild processes of liver tissue repair. This was manifested in the form of preservation of degenerative changes, fibrosis of structures and a decrease in the number of binucleated cells.

In group 1, histological examination revealed thinning of the intercellular and interlacunar connective tissue septa with insignificant compaction of the cells of the hepatic lobules and mild cellular dystrophy/

.Histological sections of rat liver in group 2 were closest to normal values. Over a larger area of sections, residual fibrosis, thinning of the connective tissue septa, mild dystrophy in some areas are revealed. The number of bi- and multinucleated cells did not differ from intact values/

The average value of the thickness of the connective tissue septa in the 3rd group was 25.5 (24.68 - 26.11) microns; in the 1st group (with the introduction of a suspension of transfected MMSC) - 16.76 (15.34 - 17.87); in the 2nd group (with the introduction of SMMSC) - 12.89 (11.76 - 13.85) microns. In the 3rd group, the thickness of the connective tissue septa significantly exceeded the corresponding indicator of the experimental groups. At the same time, differences were also revealed between the experimental groups (1st and 2nd).

Signs of hepatic tissue dystrophy in group 3 were observed in 2 animals and were poorly expressed in 4 animals. In the 1st group, they were weakly expressed in the 1st rat and were practically not observed in 5 animals. In group 2, there were practically no signs of hepatic dystrophy.

In group 3, the average value of two or more nuclear cells in one visual field did not exceed 11.5 (10.8 - 11.9), in group 1 - 9.0 (8.7 - 10.1) , and in the 2nd group - 8.2 (7.9 - 8.7). Found statistical differences between the indicators of the 1st and 2nd groups ($p = 0.02$).

Discussion

Studies of the histological parameters of animals after a two-month modeling of liver cirrhosis by the introduction of solutions of carbon tetra-

chloride and thioacetamide demonstrated the reproducibility of this method in all 54 of the 54 studied animals, conventionally divided into 3 groups - experimental and control. The lack of statistical significance of morphological parameters under the condition of a stochastic division of groups indicates the stability of this model, which gives rise to a study of drugs for the treatment of liver cirrhosis.

30 days after the reconstruction of the hepatotoxic model, as well as the introduction of a suspension of transfected MMSC (group 1) and spheroids from transfected MMSC (group 2) in comparison with a group of animals without cell therapy (group 3, control), some improvements in morphohistological parameters were revealed, which found expression in the form of a lesser thickness of connective tissue interlacunar and intercellular septa, as well as signs of dystrophy and the number of two- or more nuclear hepatocytes.

After 90 days, more pronounced positive changes were observed in the groups with cell therapy compared to both the baseline values (in all groups) and the corresponding indicators of the control group.

It seems important that in laboratory rats that were injected with cell spheroids, the morphohistological parameters were better than in rats that were treated with a suspension of transfected MMSC. This is manifested in a decrease in the number of binucleated cells, as well as in the thickness of the connective tissue septa.

The use of the formed spheroids, apparently, to a greater extent corresponds to the structural and functional features of the liver tissue under physiological conditions, when the layer-by-layer structure of cells differs in activity, depending on the distance from the lacunae.

Conclusion

The administration of MMSC transfected with a plasmid vector (carrying a useful hepatocyte growth factor gene) as monotherapy, as well as spheroids from MMSC transfected with the same vector, is accompanied by an improvement in the morphohistological parameters of the damaged liver in dynamics for 90 days after MMSC transplantation.

The introduction of SMMSC was accompanied by slightly better indicators than those in rats with the introduction of a suspension of MMSC.

Thus, the forms of the bioengineering agent selected for the study (a suspension of transfected MMSC and SMMSC) confirmed the efficacy in the treatment of liver cirrhosis in preclinical studies. At the same time, cell spheroids are apparently more promising, since they differ from other groups in accelerated repair of liver tissue damage.

References

1. Scaglione S., Kliethermes S., Cao G., Shoham D., Durazo R., Luke A., Volk M. L. et al. The epidemiology of cirrhosis in the United States // *Journal of clinical gastroenterology*. – 2015. – V. 49. – №. 8. – P. 690-696.
2. Sakai Y, Takamura M, Seki A, et al. Phase I clinical study of liver regenerative therapy for cirrhosis by intrahepatic arterial infusion of freshly isolated autologous adipose tissue-derived stromal/stem (regenerative) cell. *Regen Ther*. 2017;6:52-64. Published 2017 Mar 9. doi:10.1016/j.reth.2016.12.001.
3. Mahmood A, Seetharaman R, Kshatriya P, Patel D, Srivastava AS. Stem Cell Transplant for Advanced Stage Liver Disorders: Current Scenario and Future Prospects [published online ahead of print, 2019 Oct 4]. *Curr Med Chem*. 2019;10.2174/0929867326666191004161802. doi:10.2174/0929867326666191004161802
4. Alt EU, Winnier G, Haenel A, et al. Towards a Comprehensive Understanding of UA-ADRCs (Uncultured, Autologous, Fresh, Unmodified, Adipose Derived Regenerative Cells, Isolated at Point of Care) in Regenerative Medicine. *Cells*. 2020;9(5):E1097. Published 2020 Apr 29. doi:10.3390/cells9051097
5. Cho K.A., Ju S.Y., Cho S.J., Jung Y.J., Woo S.Y., Seoh J.Y. et al. Mesenchymal stem cells showed the highest potential for the regeneration of injured liver tissue compared with other subpopulations of the bone marrow // *Cell Biology International*. – 2009. – V. 33. – №. 7. – P. 772-777.
6. Parola M., Robino G. Oxidative stress-related molecules and liver fibrosis // *Journal of hepatology*. - 2001. - T. 35. - №. 2. - C. 297-306.
7. Nahon P, Ganne-Carrié N. Management of patients with pre-therapeutic advanced liver fibrosis following HCV eradication. *JHEP Rep*. 2019;1(6):480-489. Published 2019 Nov 18. doi:10.1016/j.jhepr.2019.11.001.
8. Mesenchymal stem cells showed the highest potential for the regeneration of injured liver tissue compared with other subpopulations of the bone marrow / K. A. Cho [et al.] // *Cell. Biol. Int*. 2009 Jul. Vol. 33, N 7. P. 772-777.
9. Zuk P.A., Zhu M., Ashjian P., De Ugarte D.A., Huang J.I., Mizuno H., Hedrick M.H. et al. Human adipose tissue is a source of multipotent stem cells // *Molecular biology of the cell*. - 2002. - V. 13. - №. 12. - P. 4279-4295.

10. Collan Y. Morphometry in pathology: another look at diagnostic histopathology. *Pathol Res Pract*. 1984;179(2):189-192. doi:10.1016/S0344-0338(84)80126-0
11. Kesten S, Fraser JK. Autologous Adipose Derived Regenerative Cells: A Platform for Therapeutic Applications. *Surg Technol Int*. 2016;29:38-44.
12. Lockhart RA, Aronowitz JA, Dos-Anjos Vilaboa S. Use of Freshly Isolated Human Adipose Stromal Cells for Clinical Applications. *Aesthet Surg J*. 2017;37(suppl_3):S4-S8. doi:10.1093/asj/sjw270

DOI 10.34660/INF.2020.59.41.027

MONITORING OF AUTOLOGOUS MESENCHYMAL STEM CELLS IN THE PATIENT'S BODY INTRODUCED INTO THE VASCULAR BED OF THE LIVER IN ORDER TO IMPROVE ITS FUNCTIONAL STATE

Kotkas Inna Evgenievna

Candidate of Medical Sciences, Associate Professor

Head of the Division of Surgery

Mechnikov North-West State Medical University

Annotation. *The goal is to track autologous mesenchymal stem cells introduced into the liver vascular bed in order to assess the possibility of their fixation in the liver tissue for further improvement of its functional state.*

Material and methods. Introduction of cellular structures labeled with iron oxide nanoparticles was performed in 20 patients diagnosed with liver cirrhosis. The injection was performed in the arterial bed of the liver. *Results.* Mesenchymal autologous stem cells labeled with iron oxide nanoparticles introduced into the liver vascular bed were tracked using magnetic resonance imaging performed 1 day after administration.

Conclusion. Mesenchymal autologous cells labeled with iron oxide nanoparticles can be tracked in the patient's body using magnetic resonance imaging. Mesenchymal autologous stem cells introduced into the vascular bed of the liver are fixed in the liver tissue, without spreading to any other organs and tissues.

Keywords: *liver cirrhosis, cell therapy, mesenchymal autologous stem cells, tracking of injected cell structures in the human body.*

Introduction

In recent years, there has been an increase in the interest of scientists around the world in regenerative medicine. The possibility of restoring the functions of various organs using cell therapy is being studied. The use of allogeneic stem cells has a large number of controversial legal issues. In this regard, the greatest interest of scientists is the use of autologous mesenchymal stem cells. Since the liver belongs to organs with a unique ability to regenerate, the possibility of stimulating its regenerative ability using cellular technologies is of interest to researchers from different countries [1-3]. To date, various ways of introducing stem cells into the human body

are proposed, however, there is no data on where the introduced cell structures directly settle. Researchers all over the world describe the possibility of tracking the introduced cellular structures in animals [4–7]. However, in none of the studies presented, we did not find information on the possibility of visualizing the introduced cellular structures in the human body. The data presented by us demonstrate the ability to track injected autologous mesenchymal stem cells in the human body.

The purpose of the study is to find out where in the patient's body the fixation of autologous mesenchymal stem cells, introduced into the vascular bed of the liver, takes place..

Material and methods

The study involved 20 patients with liver cirrhosis of various etiologies. In order to improve the functional state of the liver, the patients underwent the introduction of autologous mesenchymal stem cells into the vascular bed of the liver using endovascular surgical methods. The introduced cell structures were preliminarily marked with iron oxide nanoparticles with full preservation of cell viability. The created labels subsequently made it possible to trace the introduced cells in the patient's body using MRI.

Results

On an outpatient basis, a month before the introduction of cell structures, the procedure for isolating mesenchymal stem cells was performed. Mesenchymal stem cells were isolated from adipose tissue, which was surgically removed from the patient's inner thigh. The obtained stem cells were subjected to four passages of cultivation followed by the introduction of labels into cell structures. Autologous mesenchymal stem cells were injected using endovascular surgery. The hepatic artery was accessed through the radial artery. Celiacography was performed at the celiac trunk level to assess the anatomical structure of the liver arterial bed. After assessing the anatomy of the liver arterial bed, selective insertion of a catheter into the right or left hepatic arteries was performed, at the level of which the introduction of cellular structures was carried out, on which the procedure was completed. The next day after the injection, all patients underwent MRI in order to track the places of fixation of the injected stem cells. In all patients, the introduced cell structures were visualized in the liver tissue, without fixation in any other organs and tissues. As an example, an image of a magnetic resonance imaging scan is shown one day after the injection of autologous mesenchymal stem cells (Fig. 1).

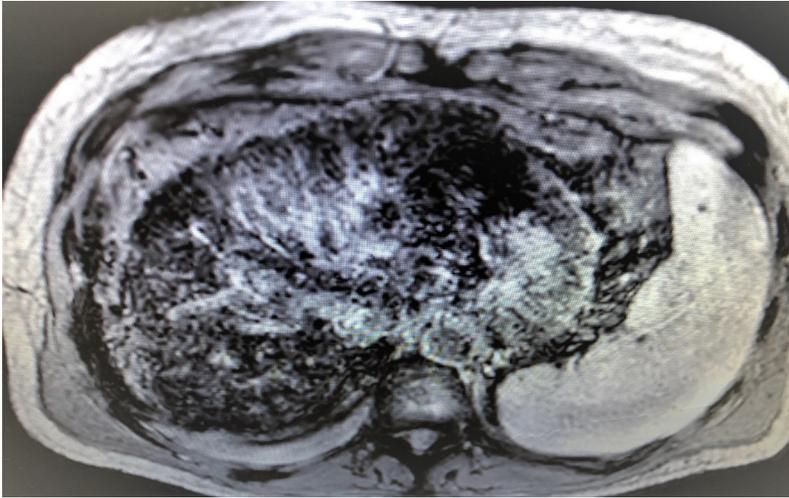


Figure 1. Image of magnetic resonance imaging on the 1st day after the introduction of cellular structures into the vascular bed of the liver. Arrows indicate the distribution of stem cells in liver tissue.

Conclusion

Our proposed method for labeling autologous mesenchymal stem cells allows tracing them in the patient's body and giving an answer to the question of where the introduced cellular structures are fixed. Thanks to the results obtained, we can assert that the introduction of cellular structures into the vascular bed of the liver leads to their 100% sedimentation in the liver tissue, which will further allow us to assess their effect on the functional state of the liver tissue.

References

1. Kantarcıoğlu M., Demirci H., Avcu F., Karslıoğlu Y., Babayiğit M.A., Karaman B., Öztürk K., Gürel H., Akdoğan Kayhan M., Kaçar S., Kubar A., Öksüzöğlü G., Ural A.U., Bağcı S. Efficacy of autologous mesenchymal stem cell transplantation in patients with liver cirrhosis. *Turkish J. Gastroenterol.* 2015; 26 (3): 244–250.
2. Salama H., Zekri A.R., Medhat E., Al Alim S.A., Ahmed O.S., Bahassy A.A., Lotfy M., Ahmed R., Musa S. Peripheral vein infusion of autologous mesenchymal stem cells in egyptian hcv-positive patients with end-stage liver disease. *Stem. Cell. Res. Ther.* 2014; 5 (3): 70.

3. Malekzadeh R., Mohamadnejad M., Alimoghaddam K., Bagheri M., Baharvand H., Ghavamzadeh A. Cell-Based Regenerative Therapy as an Alternative to Liver Transplantation for End-Stage Liver Disease: Experience from Iran. *Int. J. Organ Transplant. Med.* 2010; 1 (1): 21–27.

4. Silachev D.N., Kondakov A.K., Znamenskiy I.A., Kurashvili Yu.B., Amolenskaya A.V., Antipkin N.R., Danilina T.I., Manskikh V.N., Gulyaev M V.V., Pirogov Yu.A., Plotnikov E.Yu., Zorov D.B., Sukhikh G.T. The use of technetium-99m for in vivo monitoring of transplanted multipotent stromal cells. *Cellular technologies in biology and medicine.* 2016; 3: 188-195.

5. Zarychta-Wiśniewska W., Burdzinska A., Zagozdzon R., Dybowski B., Butrym M., Gajewski Z., Paczek L. In vivo imaging system for explants analysis-A new approach for assessment of cell transplantation effects in large animal models. *PLoS One.* 2017; 12 (9): e0184588.

6. Sun C.K., Chang C.L., Lin Y.C., Kao Y.H., Chang L.T., Yen C.H., Shao P.L., Chen C.H., Leu S., Yip H.K. Systemic administration of autologous adipose-derived mesenchymal stem cells alleviates hepatic ischemia-reperfusion injury in rats. *Crit. Care Med.* 2012; 40 (4): 1279–1290.

7. Salomone F., Barbagallo I., Puzzo L., Piazza C., Li Volti G. Efficacy of adipose tissue-mesenchymal stem cell transplantation in rats with acetaminophen liver injury. *Stem. Cell. Res.* 2013; 11 (3):1037–1044.

DOI 10.34660/INF.2020.48.98.028

SOLAR ENERGY AND PROSPECTS FOR ITS DEVELOPMENT

Zidan Olga Dmitrievna

Student

D. Mendeleev University of Chemical Technology of Russia

Habibova Natalia Zamilovna

Candidate of Engineering Sciences, Associate Professor

D. Mendeleev University of Chemical Technology of Russia

Abstract. *The problem of limited traditional energy sources is becoming more and more urgent. The need to switch to alternative energy sources and the search for methods of transforming these energy sources as dominant in energy technology is one of the global problems of mankind. The article discusses the prospects for solar energy.*

Keywords: *solar energy, photoelectric converter (PEC), perovskite solar cells (PSC).*

Solar energy is one of the most reliable sources, the total radiation power of the Sun is $4 \cdot 10^{14}$ billion kW. Considering the size of the Earth, it is not difficult to calculate that the power of solar illumination on it is $1.8 \cdot 10^5$ billion kW. About half of the radial flux is lost due to the reflection of the atmosphere, and the other half is spent on absorbing the Earth's surface and increasing its temperature. It is also important that it is difficult to use for destruction or any inhuman purposes, however, this inexhaustible and environmentally friendly source gives extremely scattered energy, in addition, the power of solar radiation constantly changes during daylight hours, and at night it is completely zero. In the future, devices for the direct conversion of solar energy into electrical energy, primarily photovoltaic generators, or photoelectric converter (PEC), will be of increasing importance. The story has survived to this day about how Archimedes defended his native Syracuse from the enemy fleet with the help of bronze mirrors held by the women of the city. The problem of preserving and improving nature, of which we are a part, requires careful attention, thoughtful and, in some cases, urgent solutions. The limited use of PEC is due to the fact that the main material from which it is made is monocrystalline silicon. It is obtained using a complex expensive technology. Scientists managed to

use amorphous silicon, which contains a small amount of hydrogen, in the form of tightly held "fragments" of silane SiH_4 molecules. The addition of volatile phosphorus and boron compounds to gases made it possible to alloy the alloys and change the nature of their conductivity. These materials and, above all, amorphous silicon containing hydrogen and fluorine, have become the beginning of a new stage in the creation of composite materials that convert solar energy into electrical energy. Such PECs are used on spacecraft, orbital stations, and also find application on Earth - where small energy sources are needed and access to these places is difficult. Already at the end of the 20th century, Miyasaka and his colleagues reported on the first photovoltaic device based on lead halide perovskite with a photoconversion efficiency of 2.2%, which used $\text{CH}_3\text{NH}_3\text{PbBr}_3$ [1]. By replacing bromine with iodine in $\text{CH}_3\text{NH}_3\text{PbBr}_3$, the photoconversion efficiency was slightly increased to 3.8%. Thereafter, in 2012, Kim et al. Successfully fabricated the first solid-state perovskite solar cell with a 9.7% photoconversion efficiency using spiro-MeOTAD as the hole transporting layer. It is noteworthy that in just the next few years, certified efficiency of power converters reached over 23%; This was implemented in 2017 as a result of the development of a thin film deposition method [2]. Perovskite solar cells (PSC) have come into the spotlight in next-generation photovoltaic technology for their incredible conversion efficiency, low cost and ease of manufacture. However, the presence of a large number of transport barriers and defects at the interfaces and grain boundaries negatively affects the PSC; this reduces their efficiency and stability and increases the hysteresis effect. The development of technologies for controlling morphology, grain boundaries, grain size, charge recombination and the density of defect states in the perovskite layer is necessary to improve their photoelectric characteristics and stability.

Based on this, the purpose of this article is to annotate the intensive research in the field of PSC additive engineering, including physical and chemical passivation, as well as the use of a wide range of organic and inorganic additives to solve these problems. Despite the success of 3D perovskite devices in increasing the efficiency of PSC and their low manufacturing costs, in the manufacture and use of these devices, researchers still face a number of critical problems, such as high toxicity of lead and low long-term stability. There is growing interest in research to develop alternative lead-free perovskites with low toxicity and high stability. Some elements, such as tin (Sn), germanium (Ge), antimony (Sb), and bismuth (Bi), have similar ionic radii, electronic configuration, and semiconductor characteristics; were proposed as potential candidates for reducing the

toxicity of lead, but the resulting devices gave lower values of the photo-conversion efficiency than lead ones [3].

The instability of lead halide perovskites when exposed to moisture, light and heat is another problem that needs to be addressed. To overcome this problem, numerous attempts have been made to improve the stability of devices. Of all the approaches to building resilience, it is the passivation methods that seem to be the most effective [4].

A typical device mainly contains five layers, such as: transparent conductive oxide (TCO), electron transfer layer (ETL), light-absorbing perovskite material, hole transport layer (HTL) and a metal electrode (figure 1) [5].

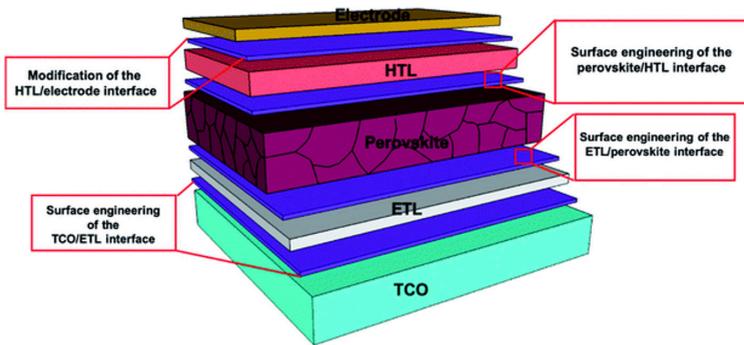


Figure 1. Normal structure of a perovskite solar cell [6]

The intermediate layer between TCO and ETL, from a surface engineering point of view, must be largely transparent and conductive, and also have the desired optoelectronic properties. Therefore, graphene is often used for this, which has a high mobility of charge carriers ($10^6 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$) and a transmittance of 98%. Wang et al. [7] demonstrated that the deposition of a nanocomposite consisting of graphene nanoparticles and anatase- TiO_2 nanoparticles on an FTO layer significantly improved the characteristics of solar cells (figure 2a). This is due to the better conductivity and favorable electron transfer of the graphene layer (figure 2b).

Another approach to changing the intermediate layer between TCO and ETL is to reduce the work function of the electrode materials. For this, it is proposed to modify the surface with ethoxylated polyethyleneimine (figure 2c)[8]. The energy level of the ITO coated with PEIE is close to the position of the conduction band to the ETL layer, which allows efficient transport of

photogenerated carriers without excessive recombination at the interface (figure 2d).

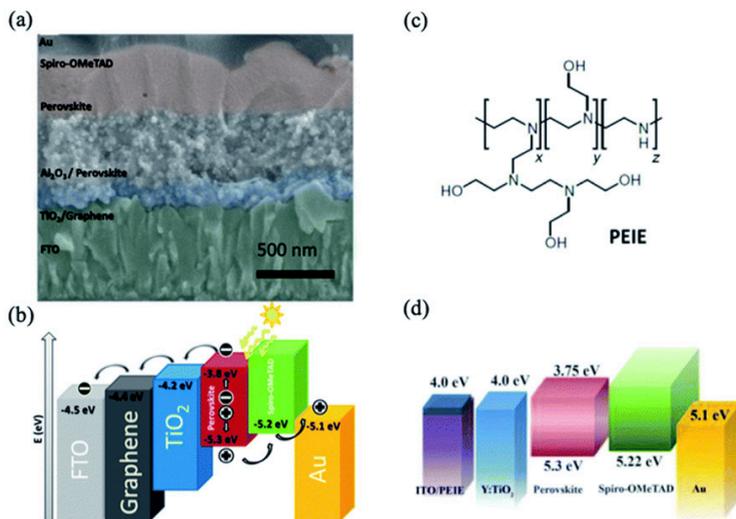


Figure 2 (a) Cross section of a planar device using graphene-TiO₂ nanocomposite on FTO. (b) Diagram of energy levels of a PSC with a graphene interfacial layer. (c) Chemical structure of polyethylenimine ethoxylate. (d) Diagram of energy levels of a PSC with an ITO substrate coated with PEIE [6].

The key global problem of our time is the human power supply and the need to integrate fundamental science and production.

References

1. Jena A. K., Kulkarni A., Miyasaka T. Halide perovskite photovoltaics: background, status, and future prospects //Chemical reviews. – 2019. – Vol. 119. – №. 5. – P. 3036-3103.
2. Lee S. J., Shin S. S., Im J., Ahn T. K., Noh J. H. Reducing carrier density in formamidinium tin perovskites and its beneficial effects on stability and efficiency of perovskite solar cells //ACS Energy Letters. – 2017. – Vol. 3. – №. 1. – P. 46-53.

3. Zhao Z., Gu F., Rao H., Ye S., Liu Z., Bian Z., Huang C. Metal Halide Perovskite Materials for Solar Cells with Long-Term Stability //Advanced Energy Materials. – 2019. – Vol. 9. – №. 3. – P. 1802671.
4. Ye M., He C., Iocozzia J., Liu X., Cui X., Meng X. Recent advances in interfacial engineering of perovskite solar cells //Journal of Physics D: Applied Physics. – 2017. – Vol. 50. – №. 37. – P. 373002.
5. Yavari M., Mazloum-Ardakani M., Gholipour S., Tavakoli M. Reducing surface recombination by a poly (4-vinylpyridine) interlayer in perovskite solar cells with high open-circuit voltage and efficiency //ACS omega. – 2018. – Vol. 3. – №. 5. – P. 5038-5043.
6. Mahapatra A., Prochowicz D., Tavakoli M. M., Trivedi S., Kumar P., Yadav P. A review of aspects of additive engineering in perovskite solar cells //Journal of Materials Chemistry A. – 2020. – Vol. 8. – №. 1. – P. 27-54.
7. Wang J. T. W., Ball J. M., Barea E. M., Abate A., Alexander-Webber J. A. Low-temperature processed electron collection layers of graphene/TiO₂ nanocomposites in thin film perovskite solar cells // Nano letters. – 2014. – Vol. 14. – №. 2. – P. 724-730.
8. Zhou Y., Fuentes-Hernandez C., Shim J., Meyer J., Giordano A. J., Li H., Fenoll M. A universal method to produce low-work function electrodes for organic electronics //Science. – 2012. – Vol. 336. – №. 6079. – P. 327-332.

FEATURES OF GROWTH AND DEVELOPMENT OF *SILYBUM MARIANUM* ON NORTH-WEST OF RUSSIA

Naida Nadezhda Michailovna

Doctor of Biological Sciences, Full Professor
Saint-Petersburg State Agrarian University

Abstract. *Milk thistle Silybum marianum from the Asteraceae family is of Mediterranean origin, it is distributed in Europe, Asia Minor and other regions. In Russia, it grows in the Caucasus, in the Volga region, in the south of Western Siberia. Milk thistle is a medicinal and melliferous plant that can be used in the production of functional food products.*

The article discusses the results of studying milk thistle in the natural and climatic conditions of the North-West of the Russian Federation (on the example of the Leningrad region). The dynamics of the phenological phases of milk thistle in the years of the study is shown, the structure of the yield and the level of productivity are presented.

In conclusion, the prospects for the cultivation of milk thistle in the natural and climatic conditions of the North-West of the Russian Federation are stated.

Keywords: *milk thistle, stages of development, baskets, fruits, achenes, flavolignans, research, cultivation.*

Milk thistle *Silybum marianum* (L.) Gaertn. from the Asteraceae family is of Mediterranean origin; it is distributed in northern Africa, southern and central Europe, Asia Minor and other regions. In Russia, it grows in the Caucasus, in the Volga region, in the south of Western Siberia, prefers dry and sunny places [1]. Milk thistle has long been used as a medicinal plant, and now it is included in the pharmacopoeias of many countries of the world.

In culture milk thistle is annual, in the wild - a biennial herb. The height of plants can reach 1.5 m and more, the stem is erect, naked, cylindrical. The pinnate, shiny leaves have numerous large, white spots. Sharp thorns are located along the edge of the leaf blade and along the veins on the lower side. The lower petiole leaves form a basal rosette, the upper leaves are sessile. Inflorescences - baskets with a diameter of 4-6 cm. Receptacle

with hairs, leaves of the envelope are green, tiled, prickly. The flowers are tubular, five-membered, pink or lilac-pink. The fruit -achene [1].

In Russia, a comprehensive study of milk thistle as a medicinal plant began in 1975. As a result, the chemical composition of milk thistle, pharmacological properties, ecological features were studied, productive varieties "Debut" and "Samaryanka" were bred. Due to the fact that Russia does not have large natural resources of milk thistle, the need for medicinal raw materials can only be met by cultivating the plant; therefore, zonal industrial technologies for its cultivation have been developed [2]. Currently, milk thistle is widely grown in the Volga region, in the south and in central Russia. The medicinal raw materials are the fruits of milk thistle - *Fructus Silybi mariani*. They have a rich chemical composition and contain fatty oil, protein, fiber, vitamins B, A, D, E, K, F, disaccharides, trace elements, enzymes, mucus, phenolic compounds, etc. [2,3,4]. The main active ingredients are flavolignans, which are stored in the pericarp of the fruit. Milk thistle fruit preparations based on flavolignans are used in the treatment of acute and chronic hepatitis, liver cirrhosis, cholecystitis and other diseases. Milk thistle fatty oil is used in food, cosmetics and medicine [2, 3]. Milk thistle is successfully used in the production of biologically active additives (BAA) and functional food products.

Milk thistle is considered an excellent honey plant, has decorative properties and is used to create impenetrable hedges and picturesque mixborders [4].

According to many authors, milk thistle belongs to plants with a wide ecological range and is considered a drought-resistant plant. However, prolonged moisture deficiency leads to a decrease in fruit yield. Milk thistle does not tolerate long-term waterlogging of the soil, it is warm and light-loving, but it can withstand short-term spring frosts [4, 5].

Currently, the rapid climate change makes it possible to promote the cultivation of some types of thermophilic medicinal plants, including milk thistle, to the north and northwest of Russia. At the same time, the previously developed zonal industrial technologies for the cultivation of milk thistle for the Volga region, the central and southern parts of the Russian Federation are not always suitable for the North-West and, in particular, for the Leningrad region. Therefore, a comprehensive study of milk thistle in new soil and climatic conditions is necessary. For a long time, we studied the features of the growth and development of milk thistle, the nature of fruiting and fruit yield, etc. [6].

The object of the study was the Milk thistle variety Debut; the experiments were carried out in the nursery of medicinal and essential

oil plants of the St. Petersburg State Agrarian University. The soil of the site is sod-podzolic medium loamy, highly cultivated, the arable layer is 24 cm. The soil cultivation system included autumn plowing to a depth of 26-27 cm with fertilization at the rate of $P_{60} K_{60}$; in the spring, cultivation was carried out with harrowing. Sowed at the end of the first - beginning of the second decade of May, 3-fold repetition, seeding depth - 2.5-3.0 cm, seeding rate - 1.5-2.0 g/m². The seeds were not pre-prepared for sowing. Distance between rows - 50 cm, between plants - 45 cm. Simultaneously with sowing, phosphorus fertilizers were applied. After sowing, the soil was rolled up. Plant care consisted of weeding and loosening, thinning if necessary. The following phenological phases were distinguished: seedlings, formation of a basal rosette, budding, flowering, fruit ripening. The baskets were harvested in August or September, in two steps, when the central baskets turned brown, later the side baskets were cut off. The fruits were dried to the required moisture content and cleaned.

The climate of the Leningrad Oblast is moderately cold and humid. Winters are relatively mild, severe frosts are quickly replaced by thaws; summers are moderately warm, sometimes cool. Analysis of weather conditions over the years of observation showed that the growing season of 2017 was characterized by late and rainy spring and a lack of heat in the summer months. The amount of precipitation in April, August, and September significantly exceeded the multiyear average, and in the remaining months was close to it. The sum of active temperatures was 1992.7°C, effective temperatures were 950.5°C. Such weather conditions adversely affected the condition of plants, they lagged behind in growth and development. The growing season of 2018 was very warm, the average monthly air temperatures were higher than the average long-term values. The amount of precipitation exceeded the multiyear average only in April and September. The sum of active temperatures reached 2643.0°C, and effective temperatures - 2397.1°C. Average monthly temperatures in 2019 were unevenly distributed: in April and May the air temperature was close to normal, in June it exceeded it by 2.7°C, and in July - below the norm by 3.4°C. Sufficient moisture fell in April and September, the rest of the months were dry, the sum of active temperatures was 2191.1°C, and effective temperatures - 1682.9°C.

In the years of observation, milk thistle shoots appeared 12-20 days after sowing (table 1). Field germination was high and amounted to 84.5-88.1%. Cotyledon leaves of milk thistle seedlings had a green color without white spots, their length almost did not change over the years and was 1.0-1.2 cm, width - 0.7-0.9 cm. Real leaves were formed with an interval

of 7-8 days in 2018 and 8-10 days in cool years. Cotyledon leaves were usually preserved in plants until the formation of a basal rosette (24-26 days). A powerful root rosette of leaves suppressed the growth of weeds in milk thistle crops. In June, the growth of the main shoot and the beginning of branching of the stem were noted. Budding began in 51-55 days from the emergence of seedlings, the height of the plants at this time was 55-96 cm. In favorable years, flowering began in the second or third decade of July, in cold 2017 - in early August. Fruit ripening was noted in August-September. In 2018-2019, achenes ripened in the central and lateral inflorescences of the 2nd order. It should be noted that our observations of the growth and development of milk thistle in the 90s of the XX century showed a different dynamics of the passage of phenological phases. So, sowing was carried out later - in the 3rd decade of May - early June, and in mid-August the plants were just beginning to bloom. Achenes in the baskets of the main shoots were tied, but did not ripen.

Milk thistle baskets are spherical, 4.5-5.5 cm in diameter, the average number of baskets on plants is 3.1-4.8 pcs. (table 2).

Table 1. Duration of the growing and interphase periods of milk thistle in Leningrad Oblast

Interphase period	Year	Phase dates	Interfacial period duration, days
Sowing - seedlings	2017	15.05-01.06	20
	2018	03.05-15.05	12
	2019	08.05-20.05	12
Seedlings - budding	2017	01.06-25.07	55
	2018	15.05-05.07	51
	2019	20.05-12.07	53
Budding - flowering	2010	25.07 - 05.08	11
	2018	05.07 - 10.07	5
	2019	12.07 - 20.07	8
Blooming - massive maturation	2017	05.08-20.09	46
	2018	10.07-15.08	36
	2019	20.07-30.08	41
Duration of vegetation period, days	2017	01.06-20.09	111
	2018	15.05-15.08	92
	2019	20.5-30.08	102

The flowers in the baskets are tubular, lilac-pink, the average number of achenes in the central baskets varied from 87.6 to 114.8 pieces over the years, and from 56 to 85 pieces in the lateral ones. The branching degree

of the main shoot is 2, less often 3 orders of magnitude.

The basket of the main shoot blooms first, and then, with an interval of 7-10 days, the baskets of the second order. By the beginning of the ripening phase of the fruit, the spines on the leaves and inflorescences become lignified. With the onset of fruit ripening in the central basket, the rosette leaves gradually die off.

Milk thistle achenes are slightly flattened laterally, 6.1-7.2 mm long and 2.1-3.1 mm wide, 1.1-1.5 mm thick. The color of the ripened achenes is brown. The crest is twice the size of the fruit itself. The weight of 1000 fruits varied over the years from 26.7 to 29.8 g

Table 2. Structural indicators of the biological yield of milk thistle in Leningrad Oblast

Year	Average number of baskets per plant, pcs.	Average number of achenes in central baskets, pcs.	Average number of ripe baskets per plant, pcs.	Productivity of 1 plant, g	Weight of 1000 achenes, g
2017	3,1	87,6	1,1	3,4	26,7
2018	4,8	114,8	4,6	5,6	29,8
2019	3,6	96,5	3,6	4,9	29,1

The analysis of milk thistle raw materials (fruits), carried out by us in 2018, showed its high quality: the sum of flavolignans was 6.6% (at a rate of at least 2.7%), the content of fatty oil was 27%. The moisture content of the raw material was 5.6-7.7% with the norm not exceeding 12%. The raw materials were pure, without organic and mineral impurities.

Thus, as our observations have shown, at present, for the natural and climatic conditions of the North-West of the Russian Federation, milk thistle is a promising species, it successfully grows, develops and forms fruits, most of which have time to ripen.

References

1. Flora of the USSR. – M.: USSR AS, V. XXVIII, 1963. – 407 P.
2. Atlas of medicinal plants of Russia. – M.: AUSRIMP, 2006. – 345 P.
3. Big encyclopedic dictionary of medicinal plants. /Under. ed. G.P. Yakovleva. – 3rd ed., rev. and add. – SPb: Special literature, 2015. – 759 P.

4. Milk thistle: questions of biology, cultivation and application / Pospelov S.V., Samorodov V.N., Kislichenko V.S., Ostapchuk A.A. – Poltava: 2008.– 164 P.

5. Kshnikatkina A.N., Gushina V.A. Influence of the timing of sowing milk thistle on grain yield. // 1st Internat. sci. pract. conf. "Plant Resources for human health" September 23-27, 2002: Materials of the conf. – V., 2002. – P.107-108.

6. Naida N.M. Biomorphological features and productivity of milk thistle in the conditions of Leningrad Oblast / Bulletin of SPbSAU, № 27, 2012. – P. 37-41.

DETERMINATION OF THE DESIGN PARAMETERS OF SEALS WITH REQUIRED PROPERTIES

Aslanov Jamaladdin Nuraddin

Doctor of Philosophy in Engineering, Associate Professor

Huseynli Zenfira Seydi

Doctor of Philosophy in Engineering

Azerbaijan State Oil Academy

Baku, Azerbaijan

Abstract. *Sealing between plug valves, direct-flow valves, adjustable throttles and between metal-metal surfaces of flange connections, which are the main components of the Christmas tree, is carried out with the help of seals. Extending the life of these seals is still relevant today.*

In the article, by determining the criteria for the compaction of the required properties of the sealing elements, methods of creating their algorithm were investigated. The scientific foundations for determining the design parameters of the required properties of the gaskets have been developed, the principles of the algorithm for determining the parameters necessary for optimizing the design have been presented.

Keywords: *sealing cuff, rubber, rubber ring, algorithm, required, optimization.*

The economic revenues of the oil and gas industry form the backbone of the global economy, and the revenues generated by improving the efficiency of equipment used in this sector will contribute to the development of the global economy as a whole.

In the oil and gas industry, the flowing method used in oil and gas production is the most economical method, and one of the main requirements is to improve the efficiency of the equipment used in this method.

Important issues are to ensure the tightness and durability of joints for various purposes related to the Christmas tree, as well as to ensure the tightness of the joints and predict their failure during operation.

Sealing between plug valves, direct-flow valves, adjustable throttles and between metal-metal surfaces of flange connections, which are the

main components of the Christmas tree, is carried out with the help of seals. Since the main unit of the Christmas tree is its connecting structures, their performance will be included in the performance criteria for the Christmas tree. When selecting parts and assemblies of locking devices in accordance with the seat, design, operating parameters and required properties, their performance can be increased several times. The goal is to create physical models of locking device assemblies in accordance with the required property. One of the important points here is to ensure that there are no "leaks" in the sealed joint zone in accordance with the requirements for the units, ensuring operational reliability and durability. The main task of the seal between the contact surfaces requiring sealing is to determine the criteria that fulfill the required technical functions of the sealing parts. These seals can exist between metal-to-metal and metal-to-rubber elements. Two or more contact zones of equipment sealed with metal and elastic materials (seals) must have such contact stress or deformation to compensate for the tightness of the connection. In order to create the required tightness for the required characteristics (pressure, temperature, speed, etc.), the elastic sealing material in this contact zone must create such a level of deformation so that the contact stress is maintained at the required limit at this moment and during operation. The first question here is elastic reporting, and the second is the study of the stress relaxation process. For this purpose, the main direction of research is the study of the functional structural potentials of seals that meet the specified requirements.

Maintaining maximum tightness between metal-to-metal surfaces depends on an even distribution of the relative pressure created by the compressive force between the contact surfaces. Uneven distribution of relative pressure excludes surface leveling. As a result, this causes non-parallel or one-sided wear on the surfaces. The uneven distribution of relative pressure is clearly evident in a pair of shields and seats, which are a common type of shut-off device.

In the design of locking devices, its placement in the nests of parts and assemblies should be based on the principle of uniform distribution of relative pressure.

The principle is as follows:

When installing parts and components of equipment in the socket, the relative pressure between the contact areas of their parts must be evenly distributed over the contact surfaces.

In a device created according to this principle, the resistance to friction and wear increases many times over. So, for example, consider the

shut-off valve assembly. Its tribotechnical unit also includes rubber seals. During operation, the cuff assembly is deformed under the influence of periodically changing loads. As a result, under the influence of variable and prolonged loads, the material gets tired, then internal cracks appear and the cuff gradually collapses. Vibration in the sealing unit also causes a collision when rubbing and partially worn surfaces meet, which leads to rapid destruction of the cuff surface in the contact zone [1, 2].

The factors that contribute to cuff failure are listed below:

- Deformation under the action of a cyclic (periodic) driving force;
- The appearance of long-term and variable designations of stresses;
- Appearance of internal stress cracks and material fatigue;

4. Loss of performance due to leakage of the cuff assembly due to fatigue.

To protect against such cases, the dimensions of the elements must be selected in accordance with the required properties.

Therefore, the goal is to create an algorithm for determining the compaction criteria of the required properties of the sealing elements. To create an algorithm, you need to define functionals.

These functionals represent the "deformation" potentials of sealing materials, additional energies that determine the structure of the material, and "mixed" functionals that depend on the boundary conditions of the structure (registering these conditions) when sealing the joints of the reinforcement. Determination of the potential energy functions of deformation of the microstructure of the seal, according to the Euler minimization condition of the principle of variation, and this approach to solving the problem is reduced to optimization problems, which, of course, is one of the main problems of mechanics. In general, there are three main problems in mechanics:

The first is the behavior of materials when creating models, the second is the development of computational methods that allow predicting changes in the behavior of mechanical systems under certain loads; the third - questions of synthesis [3, 4, 5].

Once the models have been built, it is possible to look at solving the most important practical problems by developing general-purpose computational methods that can explain the behavioral properties of materials of good quality and magnitude.

Let us answer the question posed by the calculation: the structure (which we will design) should behave like the properties (characteristics) specified in advance (from the very beginning). Here, of course, we are talking about passive control of properties (or assumed), that is, control

of properties with design parameters. As a rule, such a control process presupposes a good study of the effect of changing a particular structural parameter. In this regard, in such situations, certain design features should be used when creating sealed equipment assemblies with potential properties, i.e. mechanical characteristics necessary in computational practice. Using this design aspect of elastic and highly elastic sealing materials, by varying their design parameters and determining their tightness criteria, it is possible to create designs that provide long-term sealing, responding to different characteristics and different loading directions. The main task to be solved here is the synthesis of stress diagrams ("diagrams") for a given contact surface (sealed surface-joint).

The volume of optimization problems in synthesis in mechanics is growing. This means that the design has to be adapted to the requirements (for example, the specified hardness curve of the sealant, stress plot, strength, etc.) and the optimization criterion, which assumes the values of minimum volume or maximum service life. The optimization problem, of course, can be considered solved only if a number of structures (meaning the spacecraft sealing units) or a set of a number of parameters satisfy all the requirements. From all these usual search procedures, the option will be selected that provides the properties of the extreme tightness criterion. So, let's make a few notes about the exact study of the criteria in the main solution of the problem.

We have to accept the durability of the seals as a criterion for optimizing the sealing components of the equipment.

However, unfortunately, the criterion of longevity is the most difficult predicted value. From the point of view of writing a model that determines the physical nature of the compaction process, there are certain approaches, this is the deformation energy accumulated in the seal, part of it is realized in cyclic oscillations (which are characterized by the area of the hysteresis loop) in the seal, and part in the formation of temperature and become unusable from wear and tear. When the construction is simple, i.e. there is an opportunity to "linearize" the functionality of the potentials, the calculation accuracy increases, and the built-in, i.e. the recorded model allows predicting the critical state of seal failure by summing all cycles.

However, for more complex cases, it is possible to determine the durability using empirical criteria, assuming that in the calculations this energy is used to generate temperature. This criterion can be called the amount of spontaneous combustion ("heating") from the stationary temperature of this type (floor).

Thus, taking into account the direction of the problem being solved

when designing seals is one of the important conditions for increasing the durability of these units.

Conclusion

The scientific foundations for determining the design parameters of the required properties of the gaskets have been developed, the principles of the algorithm for determining the parameters necessary for optimizing the design have been presented.

References

1. Aslanov J.N., Huseynli Z.S., Investigation of the friction process in improved valve designs, Oilfield business, № 2, Moscow, 2013.
2. Aslanov J.N. Series produced by the shield-saddle bridge valves obstructive structures for improved wear resistance tested in pairs and strategy of the gate valves' gates. Program methodology. AZİNMAŞ. Bakı, 2014.
3. Zhemochkin B.N. Elasticity theory. M., State. publ. 1957, P.257.
4. Korn G. and Korn T. Handbook of Mathematics. M. Science 1974-632 P.
5. Green A. Large elastic deformations and nonlinear mechanics of continuous medium.-Moscow, World, 1965.

Scientific publication

**International Conference
“Process Management and Scientific Developments”**

Birmingham, United Kingdom
(Novotel Birmingham Centre, November 25, 2020)

Signed in print 30.11.2020 г. 60x84/16.
Ed. No. 3. Circulation of 500 copies.
Scientific publishing house Infinity, 2020.