



# SCIENTIFIC RESEARCH OF THE SCO COUNTRIES: SYNERGY AND INTEGRATION

上合组织国家的科学研究：协同和一体化

Proceedings of the  
International Conference

Date:  
May 25

Beijing, China 2022



上合组织国家的科学研究：协同和一体化  
国际会议

参与者的英文报告

International Conference  
“Scientific research of the SCO  
countries: synergy and integration”

Part 2: Participants' reports in English

2022年5月25日，中国北京  
May 25, 2022. Beijing, PRC

Proceedings of the International Conference  
**“Scientific research of the SCO countries: synergy  
and integration”**. Part 2 - Reports in English

(May 25, 2022. Beijing, PRC)

ISBN 978-5-905695-82-7

这些会议文结合了会议的材料 – 研究论文和科学工作者的论文报告。它考察了职业化人格的技术和社会学问题。一些文章涉及人格职业化研究问题的理论和方法论方法和原则。

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评估地区竞争力水平的模型

**MODELS FOR ASSESSING THE LEVEL OF COMPETITIVENESS OF  
REGIONS**

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本文分析了评估俄罗斯和国外地区竞争力的最常用方法。作者确定了所考虑方法的优缺点，并推导出了评估区域竞争力的通用算法。

关键词：竞争力，区域，区域发展，评级，指数。

**Abstract.** *This article provides an analysis of the most common methods for assessing the competitiveness of regions in Russia and abroad. The author identified the strengths and weaknesses of the considered methods, and also derived a general algorithm for assessing regional competitiveness.*

**Keywords:** *competitiveness, region, regional development, rating, index.*

Regional competitiveness reflects the level of socio-economic development of the territory, which makes it possible to compare them with other regions. As a rule, the comparison includes the level and quality of life of the population, the ability to realize the existing potential to achieve stable economic development.

In economic theory, the idea of competitiveness was first formulated by A. Smith in the XVIII century and then supplemented by D. Ricardo in the theory of comparative advantage. During this time, many different approaches have been formed:

- behavioral approach proposed by A. Marshall;
- structural approach of F. Edgeworth and J. Creedy;

- functional approach of J. Schumpeter;
- T. Veblen's institutional approach
- the theory of competitive advantages developed by M. Porter;
- spatial study of competitiveness, formulated by P. Krugman, B. Roberts and A. Murray;
- new models of economic growth with endogenous technological progress by R. Nelson and P. Romer.

The most popular, it seems to us, among these approaches are the ideas of M. Porter. The core of his theory was the "competitive rhombus" model, in the corners of which the main factors affecting the competitive environment are located: the state of demand, the conditions of production factors, related and supporting industries, company strategy and intra-industry rivalry. As for competition at the level of countries and regions, Porter identified several stages of their development. At the first stage, the factors of production serve as the driving force of development. The second stage is characterized by the transition to a movement dependent on investment. Then comes the stage of development, due to the growth of innovations (in this case, all the factors of the "competitive rhombus" work effectively). M. Porter called the final stage the stage of wealth.

The competitiveness of Russian regions, according to representatives of the Ural school, depends on a list of comparative advantages, including those given by nature, due to the efficiency of the state legal and political systems, the development of science, technology and innovation. [1] As we can see, competitiveness depends not only on favorable geographical location, but also on factors of production, and investment, and "on the ability to innovate and modernize". [2, p. 162]

Despite the importance of assessing the competitiveness of the region for its further development, a standardized methodology or uniform, generally accepted assessment criteria. So, for example, the International Institute for Management Development proposes a methodology according to which regional competitiveness is assessed according to 4 criteria: the effectiveness of the government, economy, business and infrastructure. Thanks to this technique, it even becomes possible to simulate possible deviations or improvements when indicators change. [3]

One of the most ambitious is the global competitiveness assessment method created for the World Economic Forum and first published in 2004. The final index is calculated by summing up more than a hundred indicators, divided into 12 thematic categories: public and private institutions, macroeconomic stability, healthcare, education, infrastructure, efficiency of the goods and services market, the level of innovation and business development, etc. However, unlike the method proposed by the International Institute for Management Development, this approach does not allow modeling situations when parameters change. [4]

P. Rapkin and J. Strand proposed to use a matrix with coordinates for three  
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indicators to assess the competitiveness of the region: "the level of efficiency in the use of resources - the standard of living"; "the level of investment attractiveness - the efficiency of resource use"; "the level of investment attractiveness - the standard of living". [5] This suggests that the ratio of the level of efficiency in the use of resources and the standard of living of the population closely depends on how much the state and business care about the welfare and quality of life of the local population.

Asia has also accumulated its own experience in assessing the competitiveness of cities and regions. The competitiveness indicator is derived on the basis of 28 parameters, including the level of education, environment and sanitation, economic indicators, price levels, security, the degree of development of health care, transport infrastructure, quality of communication, accessibility of recreation, etc. [6]

Russian researchers propose to assess competitiveness by deriving an integral assessment based on statistical data, ranks and expert assessments. However, integral values are relative indicators that do not depend on the size of the territory, as well as the population living on it. V. V. Pechatkin, S. U. Salikhov, V. A. Sablina propose to calculate the integral indicator of the competitiveness of the region according to the following formula:

$$Q_j = \sum_{i=1}^h \frac{U_{ij}^P}{U_{av}^P} 100 + \sum_{i=1}^k \frac{U_{ij}^k}{U_{av}^k} 100, [7]$$

where  $Q_j$  – integral indicator of competitiveness of the  $j$ -th region;  $k$  – number of indicators;  $U_{ij}^P$  – the value of the  $i$ -th indicator of the  $j$ -th region, characterizing the ability of the region to produce goods and services in a competitive environment;  $U_{av}^P$  – the average Russian value of the same indicator;  $U_{ij}^k$  – the value of the  $i$ -th indicator of the  $j$ -th region characterizing the quality of life of the population;  $U_{av}^k$  – average Russian value of the same indicator.

Calculations according to the presented formula can show fairly accurate information with a large variability of indicators.

Also, one of the options for assessing regional competitiveness in Russia is the IRPEX index. [8] The rating of regions using this method is formed on the basis of 130 indicators divided into four thematic groups and analyzed in three stages. Representatives of federal thematic departments and experts in the field of regional development participate in assessing the quality and level of influence of certain factors on the development of the territory. Each indicator is calculated in the range from 1 to 100. This is one of the most complete and versatile ratings. According to the results of calculations, the rating of all subjects of the Russian Federation is formed. The ranking indicates not only the specific place of each region, but also its degree of lagging behind the region that showed the best results

in the selected indicator.

A number of authors, including N. Kizim, E. Kryachko, consider ranking methods of assessment to be the most complete in terms of coverage. The rank method is an aggregation of a set of private indicators into more general ones. There are three main components: meso-, micro- and macro-level of competitiveness. [9] Consider each of them in more detail. The meso- and micro-levels include: the concentration of production; financial and innovative potential of enterprises located in the region; export potential. The macro level of competitiveness reflects other aspects: natural resource potential; labor potential; production potential; scientific and technical potential; business climate; investment potential. A B.M. Grinchel and N.E. Kostylev, within the framework of the rank estimation method, three groups of parameters are distinguished: the share of production of certain types of industrial products; socio-economic assessment and the degree of specialization of the region. In total, they propose to evaluate 23 indicators that reflect the resource and financial potential of the territory, the environment and the degree of development of organizations. [10]

R. Fatkhutdinov expressed interesting ideas about ensuring regional competitiveness. The author is sure that it directly depends on the quality of management. He proposed the following chain: quality of education – innovation – competitiveness – resource conservation – quality of life. Thus, it is possible to assess the strategic competitiveness.

A popular technique for many years has been the technique proposed by V.V. Merkushev. [11] He singled out the three most important systems of indicators: the system of indicators of regional efficiency, the system of indicators of the economic potential of the region, the system of indicators of competitive advantages. However, any comparison, according to Merkushev, must be carried out taking into account the state of the territory at different time intervals. According to the results of the level of competitiveness, he divided all regions into five groups: high level; high enough; average; short; uncompetitive regions. All the necessary information for conducting an analysis using this method is in the public domain, the algorithm for selecting criteria for evaluation is clearly regulated and understandable. However, such an interesting technique has its drawbacks. For example, it does not take into account indicators of social orientation at all.

Quite simple in mathematical calculations and accessibility is the methodology for assessing the level of competitiveness of the region, developed by N.I. Larina and A.I. Makaev. [12] They break competitiveness indices into groups. The first such group includes the existing level of competitiveness of Russian regions. Then, based on the index of innovation and the index of development of infrastructure and communication systems, the strategic potential of competitiveness is assessed. The arithmetic mean of these two indices serves as a composite index

of competitiveness. It should be noted that this method allows to evaluate only the overall economic development.

In conclusion, it can be noted that almost any algorithm for assessing the competitiveness of regions conditionally goes through several important stages:

1. selection of competitively significant criteria for comparing the positions of the selected territories;
2. selection of key factors of the region's competitiveness (the more there are, the more objective the conclusions about the level of competitiveness);
3. formation of a base for calculations;
4. calculation of estimates for all selected local parameters and factors;
5. calculation of an integral assessment of the level of competitiveness of the territory using the method of weighted average assessment, or methods of correlation and regression analysis.

Determining the level of competitiveness of the region allows not only to assess its strengths and weaknesses, but also makes it possible to adjust the existing development strategy. However, we believe that it is more objective and useful not to calculate the integral indicator for each region, but to assess the competitiveness of the territory, based on the analysis of individual sub-indices that reflect the development of different areas of the region.

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集聚过程的模拟

**SIMULATION OF AGGLOMERATION PROCESSES**

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两个地区乃至整个国家的社会和经济发展的驱动力都集中在现代城市群中。本文描述了使用经济和数学方法对集聚过程进行建模，并定义了向量或集聚过程的组成部分。通过研究，可以得出关于人口的主导作用及其在城市群发展载体中的变化趋势的结论。

关键词：集聚区、罗斯托夫州、启发式模型、仿真模型、经济发展、自治市、发展向量

**Abstract.** *Drivers of social and economic development of both regions and the country as a whole are localized in modern agglomerations. The article describes the modeling of agglomeration processes using economic and mathematical methods, and also defines the components of a vector or agglomeration process. The study made it possible to come to the conclusion about the dominant role of the population and the trends in its change in the vector of development of the urban agglomeration.*

**Keywords:** *agglomeration, Rostov Oblast, heuristic model, simulation model, economic development, municipality, development vector*

There is a wide variety of definitions of "agglomeration" in the scientific literature. It comes from the Latin word "attach" and now denotes a cluster of cities and other populated areas, between which stable ties arise, causing common interests and ties (industrial, labor, cultural and community, recreational) [1]. Such territories develop due to the effect of scale and the effect of localization, due to the concentration of a large number of enterprises on it, the total costs are reduced.

The mechanisms of the formation of agglomerations have been discussed in Russia since about the 1960s, but this topic has become especially relevant in the XXI century. According to V.V. Tabolin, the emergence of urban agglomerations is typical for areas with a high population density and development of the territory, with a wide length of transport and communication links, a multi-stage system of urban economy and a diversified economy, management complexity, deteriorating environmental conditions [2, p. 9-10].

Agglomeration can be an effective tool for developing strategies for sustainable socio-economic development [3]. No wonder it is singled out among the main priorities of the regional development of the Russian Federation. The strategies "Fundamentals of the state policy of regional development of the Russian Federation for the period up to 2025" urban agglomerations are reflected as centers of economic growth, in which the main modern resources necessary for the further development of the territory are concentrated [4].

For the first time, the Strategy reflects the definition of large (with a total population of 500 thousand people - 1000 thousand people) and very large agglomerations (the number of inhabitants exceeds 1 million people) [5]. And, as we know, the development of any large system is built on the resolution of contradictions during the interaction of various components within this system, which leads to a change in its state.

If we consider the concept of "agglomeration" from the point of view of system analysis, then it is a self-generating, self-regulating, self-organizing open system that combines natural, social and economic subsystems at the regional level. However, in reality, it is practically impossible to separate these subsystems; accordingly, the analysis of each of the subsystems separately seems to be a rather difficult task.

A theoretical understanding of the nature of agglomeration processes can be achieved with the help of model concepts. Within the framework of classical economic theories, one can refer to representatives of neoclassical theory (Ricardo, Heckscher, Ohlin, 1933; Samuelson, 1964; Jones, 1971), new trade theory (Krugman, 1980, Melitz, 2003), economic geography (Fujita, 2007; Rastvortseva, 2013), and as part of the construction of mathematical models, consider the phenomenological heuristic works of Kiseleva and co-authors or the simulation and econometric ideas of Gurman et al., 1996, 2003; Agureeva, Miyugin, Pyshny, 2014; Pavlova, 2003; Alieva et al 200; Kosinsky et al. 2013. Let us consider the latter options in more detail.

Heuristic models are among the most complex. They require a rigorous analysis of the data and an accurate choice of phase variables that reflect the development of the agglomeration. At the same time, heuristic models have the main advantage - to characterize the agglomeration in time and space. The fruitfulness of this approach lies in the wide possibility of constructing phenomenological

models that allow their analysis in the language of concepts generalized in the category of the language of system analysis [6].

Simulation and econometric models are more limited in their use cases. The main problem is that these models do not allow one to arrive at any analytical results characterizing the fundamental properties of agglomerations. Numerical and dynamic estimates obtained by this method remain reliable only in a short time period and are not used for long-term forecasts.

It should be taken into account that the forces that influence the development of agglomerations are non-linear, and therefore one linear theory is not enough to describe their dynamics and structural changes. A feature of nonlinear systems is the dependence of the characteristics of the components both at the present time and at some previous moments. So, for example, agglomerations are oscillatory nonlinear systems with delay. This must be taken into account in mathematical modeling. But in simulation or econometric models, it is not possible to apply these data to obtain quantitative estimates of agglomeration processes. At the same time, phenomenological heuristic models make it possible to come to qualitative conclusions regarding the economic activity of an urbanized territory.

The stable equilibrium of an urban agglomeration is characterized by a set of special "points". An unstable equilibrium can lead to two different outcomes. In the case of the concentration of economic activity to the maximum limits in one territory, the issue of expanding the possible boundaries of the agglomeration becomes acute. In the second variant, economic activity within a given territory is catastrophically reduced, along with which the agglomeration itself disappears.

Mathematical modeling methods make it possible to conduct experiments and obtain empirical material even in cases where ordinary observation is impossible, as is the case with an urban agglomeration. In such cases, accepting the qualitative paradigms of non-parametric, kinetic modeling of large systems, one has to resort to the construction of phenomenological models using phase portraits. The main task in this case remains the choice of phase variables that generalize the properties of the system and outline its boundaries. The same phase variables can demonstrate changes in the properties of the system and its attributes, the nature of their interaction makes it possible to assess the state of the system. The understanding of such regularities partly lies in the fundamental properties of the evolution of agglomeration.

Let us highlight the main provisions that reveal the agglomeration as a phenomenon of the development of a densely populated territory. These conceptual provisions can serve as a justification for the validity of phenomenological heuristic modeling of the genesis of an urban agglomeration and a reasoned choice of model parameters and variables.

As the first position, we can single out the basing of the agglomeration process

on the mechanism of regulation of the dynamics of the values of the characteristics of the agglomeration, its structure and evolution. The second provision can be formulated as follows: the action of the urban agglomeration regulation mechanism is carried out in accordance with the values of the components of the vectors of centripetal and centrifugal forces of the agglomeration process, taking into account the effect of delay and inertia of the characteristics of the urban agglomeration. The third provision refers to the conditionality of the classification of forces that affect the development of agglomeration, and the generality of the coordinate space of the components of the vectors of centripetal forces. The fourth provision emphasizes that the motives of the population determine the components of the vectors of the forces of the agglomeration process. And, finally, the fifth position: in the mechanisms of the system of regulation of the structure and dynamics of the urban agglomeration, significant changes in direct and reverse, positive and negative feedbacks are possible, leading to the feasibility of the occurrence of a bifurcation effect, which are caused by qualitative and quantitative changes in the composition of the population.

Among the basic factors for constructing the space of components of the force vectors of the agglomeration process, the following can be distinguished:

- population of an urban agglomeration of working age, its composition and mobility;
- spatial and temporal boundaries of the urban agglomeration;
- socio-economic needs of the population;
- self-developing single base and superstructure of the ecological-socio-economic complex in the urban agglomeration system;
- efficient system of opportunities;
- favorable location of the urban agglomeration and its ecological situation;
- rural development and standard of living in rural areas;
- the standard of living of the urban population.

An analysis of intrasystem factors influencing agglomeration processes showed that most of the vector components depend on the population size and the rate of its change. In this case, the phase variables of the state of the agglomeration are its number  $x_n$ , as well as the rate of its change  $y = \left( \frac{x_{n+1}}{x_n} \right)$ , where  $n$  – is a certain moment on the time scale. The time interval can be chosen with a focus on the predictive development of the urban agglomeration and the availability of accumulated empirical material. Such characteristics are aggregated and justified by agglomeration trends.

To determine the population of the agglomeration back in the 80-90s, the Institute of Geography of the Russian Academy of Sciences proposed the formula [7]:

$$P = \frac{M_m + N_n}{K_{dev}}$$

where  $P$  – urban population of the agglomeration;  $M$  and  $m$  – the number of cities and urban-type settlements, respectively;  $m$  and  $n$  – share in the urban population of the agglomeration;  $K_{\text{dev}}$  – human development index (integral indicator).

And the dynamics of population growth in the agglomeration is calculated using the following formula:

$$H_{t+n} = P_n \left( 1 + \frac{K_{g.g.}}{1000} \right),$$

where  $P_n$  – population at the beginning of the planning period;  $t$  – the number of years for which the calculation is forecasted;  $K_{g.g.}$  – coefficient of general population growth.

As numerous studies show, the population of an urban agglomeration and its growth largely depend on the general standard of living, the level of pollution of the natural environment, informatization, the prospects and availability of housing space, the development of the energy system, as well as water supply and waste disposal systems. There is a statistically significant relationship between the parameters of the concentration of economic activity of the population, as one of the components of the vector of strength of the agglomeration process, and the indicators of the well-being of the local population (the coefficient of determination is at least 87%). At the same time, it should be noted that in the process of interaction of various components of the agglomeration, both positive and negative direct and feedback relationships are formed. Thanks to an understanding of the processes taking place in agglomerations, it is possible to build a state strategy for territorial development following the example of the formation of a “smart home”, “smart city”, “smart region” system.

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竞争者和竞争力在经济体系类型形成中的作用

## THE ROLE OF COMPETITORS AND COMPETITIVENESS IN THE FORMATION OF THE TYPE OF ECONOMIC SYSTEM

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经济体系是在有形和无形商品的生产、分配、交换和消费过程中建立起来的一套有序的经济关系。在本文中，我们感兴趣的是不同类型的经济体系所产生的先锋产品的竞争。基础部门和先锋部门的竞争产品的开发彼此不同，并影响结构要素之间的相互作用。本研究中的系统化因素对提高竞争力有影响。

关键词：经济体制类型 计划经济 市场经济 竞争力 竞争产品 竞争者 劳动力

**Annotation.** *The economic system is an orderly set of economic relations that are established in the production, distribution, exchange and consumption of tangible and intangible goods. In this article we are interested in the competition of pioneer products produced by the different types of economic systems. The development of a competitive product of the basic and pioneer sectors differs from each other and affects the interaction between structural elements. The systematized factors in this study have an impact on improving competitiveness.*

**Keywords:** *types of economic system, planned economy, market economy, competitiveness, competitive product, competitors, labor force*

The economic system has a complex structure, but at the same time all its elements are subordinated to the whole. The economic system reflects the special structure of society arising from the practice and specific conditions. Let's con-

sider the existing definitions of the economy structure, which are more consistent with the purpose of our research.

Yu.M. Osipov characterizes the economy structure in this way: "The economy...is structural... it is economically structural, that is, certain economic parts are characteristic of the economy..." [1, p.3]. The interpretation of the economy structure proposed by Yu.V. Yakovets is interesting. According to him, the economic structure as a complex of structural characteristics of the economic space in the broad sense of the word, and in the narrow sense, it is a sector of the economy with an appropriate form of ownership [2]. A.I. Popov points out that the structure of the economic system "is characterized as a set of elements that make up the socio-economic system and the interrelationships of these elements in the process of reproduction" [3, p.19]. Currently, a sufficient number of types of economic structures classification have been proposed. In particular, F. Quesnay and K. Marx distinguish a classification according to the natural and cost composition of the social product [4]. A.Fisher, K.Clark, D.Bell, T.P.Nikolaeva, N.N. Livensev propose the allocation of a certain number of the economy sectors [5, p.49]. R. Barr, A.P. Gradov, A.M. Babashkina introduce a polystructural classification of the structure of the economy [6, p.159-161]. There is a classification of types of economic structures by the number of hierarchy levels. In particular, according to the theory of Yu.V. Yaremenko, the structure of the economy has the form of a multilevel pyramid [7, p.47].

We take the modified two-sector model of the economic system as the basis for our further reasoning. This model shows not only the unity of production and consumption processes, the underlying causes of the formation of different types of economic systems, but also allows us to identify the role, significance and mechanism of the labor influence on the structure of the economy.

The essence of this model is that in any economy there are two sectors: basic and pioneer. The basic sector produces traditional, basic products for survival of economic system. Besides to the basic sector, there is a pioneer sector that produces pioneering, innovative products. Pioneer products are characterized by the following main features: a) these are products that meet new needs, b) these are more complex products that require the development of advanced technologies and high labor costs, c) they are produced in quantities less than necessary, that is why they do not provide normal reproduction.

In the production of a pioneer product, due to its novelty and increased complexity, the costs are not covered by the results. Therefore, the development of a pioneer product is possible only by withdrawing resources from the basic sector. Thus, one of the biggest structural problems is determining the optimal ratio between two sectors of the economy (basic and pioneer) at the existing level of economic development. We will be based on the statement that the existence of a type of economic system depends on a certain set of structural characteristics.

For a market economy, this is one set of characteristics, for a planned economy – another, for a mixed economy – various combinations of structural characteristics.

According to the two-sector model, there were two types of pure economic system that have historically been formed over a long time period. The market type, based on prices, and the planned, based on volumes. The methods of organizing the economy are determined by the proportion between the basic and pioneer sectors. In turn, this structural proportion depends on a number of factors, which we define as structural characteristics. In our opinion, all structural characteristics will be more or less influenced by the labor force. The labor force will have a particularly strong influence on structural characteristics that affect the proportion between sectors.

Let's clarify that the division of labor can be intersystem (between different systems) and intra-system (within the same system). To do this, we turn to Table 1, which indicates the characteristic - the presence of competitors, in the situation of market and planned economies in the structure of intersystem characteristics.

**Table 1 – Structural characteristics affecting the type of economic system**

Characteristics	Possible values	
	market system	planned system
The intersystem characteristics		
System specialization	pioneer product	pioneer product
Competitors	exist	not to exist
System openness level	high	low
Providers of basic recourses	competitor	monopolist
Consumers of pioneer products	competitors	monopolists

The type of economic system is determined by the mechanism of regulating the proportions between the basic and pioneer sectors of the economy. In the conditions of market relations, the proportions of the development of these sectors are regulated by means of prices, which are formed as a result of fluctuations in supply and demand. A fundamentally different situation takes place in a centralized economy. The ratio between the basic and pioneer sectors is determined by the economic center (government). At the same time, there are large-scale reallocations of funds from one sector to another.

Industrial products began to act as pioneer products in the market economy. The most important inventions of the XVIII-XIX centuries were the creation of a steam engine, the invention of methods for transmitting electricity, the creation of chemical materials. They led to the fact that there was an incredible opportunity to create new (pioneer) products in advanced economic systems compared to the

previous period. Financing of this process was carried out by accumulating sources of initial capital accumulation.

The most important item of income of the developing capitalist class was the profitability of the basic sector of the economy, which produces basic products: agricultural products, products of the shipbuilding, textile, mining industries, handicrafts, etc. Historically, the leading countries, such as the Netherlands, the United Kingdom, the United States, France, Germany, Italy, have stood out, determining the direction of other countries development operating in market conditions. As for the competition, it is important to note that it has been beginning as a process of rivalry and competitiveness with the development of the capitalist economy.

As you know, there are different types of competition depending on the type of market structures, as well as different levels of competition, for example, between producers, between consumers; interindustry competition, competition of economic systems, etc. We are interested in the competition of pioneer products produced by the different economic systems. According to these conditions, intense competition for benefits is inevitable. As a result, competition affects the economic sphere of human activity.

As history shows there are different ways of conquering markets, obtaining new sources and resources to the production process and to create finished products. In the modern world, in conditions of competition between economic systems, between industries, between enterprises, between products, agents, who are able to create complex products that are inaccessible to others, receive more income and are able to maximize profits. Resources for the reproduction of products are exhausted by their properties, so the development of new technologies does not remove the issue of competition for the most favorable conditions for their consumption.

We are also seeing the development of the pioneer sector everywhere, from space technologies to the creation of vaccines and nano-products. And here we are again faced with competition, because the question of who will be the first to start the production of a pioneer product is, in fact, decisive. It is not enough to create an innovation; it is still necessary to provide the production with appropriate facilities and labor to be put on stream. Thus, the most competitive system is capable of producing a complex product with the required characteristics.

Digital technologies allow for the fast exchange of information. Digital technologies contribute to an increase the level of competition at both micro and macro levels. According to the level of labor productivity as a characteristic of economy real sector it is possible to describe the dynamics of the pioneer sector. The products of the pioneer sector, which produces innovations, are able to maintain constantly a high level of labor productivity in the system as a whole due to positive rates of labor productivity. Consequently, such a system will be a worthy

competitor in world economic relations.

In the economic chain, a new product goes through the stages of the individual, special and universal, depending on its social significance. Information technology products are not as common as household goods. Despite their availability, information technology products can be attributed to the special than universal. According to the annual global research by WeAreSocial and HootsuiteDigital 2020, 59% of the world's population uses the Internet in 2020, and the number of mobile users is 67%.

The speed of information transfer and the distance between countries are rapidly decreasing. Different electronic applications help to make, for example, cars more affordable vehicle, shifting focus from the sphere of personal consumption to universal. However, we cannot say confidently that these products have become as accessible as the usual things like a fork, a spoon or a cup. Economic systems that own technologies and produce an individual or a special product will be the most competitive. These economic systems receive income from the sale of complex innovative products that cannot be produced by another participant in world trade for some time.

The time period is connected both with the strategies of advancing or catching up development, and also with the development and movement of the product through the system. A pioneer product, getting out of the R&D stage, begins its way into mass or serial production, then receives the status of a semi-pioneer product as it develops and then becomes a basic product. A two-sector model of the economy illustrates this approach. It allows analyzing the transformation of a product from an individual in pioneer sector to universal in the basic sector. At the same time, it should be noted that the stage of special occurs when the product passes from the stage of individual to universal.

According to the two-sector model of the economy, the systems interact with each other and are ranked not only according to the pioneer or basic nature of the manufactured product, but also according to the division of labor, which determines the specialization of the system [8;9]. Systems at a higher level of specialization compete with simpler products of the system. At the same time, competition arises from interindustry interaction and from the production of substitute goods. For example, a consumer may choose not more expensive and latest model of computing equipment, but cheaper model, due to lack of need for technological innovations for special activities.

Having considered the movement of a product from the creation process to universal use, it is necessary to mention that the way for such product will be different and will depend on many factors. We need to identify those factors that are important in the framework of the study and have a direct impact on the formation of a competitive product that allows to get own surplus product or the surplus

product of competitors. In addition to the most important indicators as labor and capital, the inseparable competitive advantages, the way of interaction between structural components within the system, a place in the intersystem division of labor, as well as the sector of the economy in which competitive production arises are also important to the point of view of the competitive industries formation. Inseparable competitive advantages allow the economic system to provide conditions for price competition.

A favorable geographical location, the availability of cheap energy sources and resources in the manufacture of a product allow the system to obtain greater surplus value compared to other participants in world trade. The efficiency of the redistribution of the received value depends on the way of structural components interaction. Economists have explored many options for the interaction between structural components, but they all lead to main three ones: 1) management by the government (planned economy); 2) through the delegation of authorities to distribute resources and benefits between a multitude of participants in economic activity (market economy); 3) a mixed model combining features of 1 and 2 variants in different ratios. In the exchange process interact both the pioneer and the basic sector.

If one of the sectors gives the product of its base sector, which has limited number of technological stages of production and low level of technological development, and in return receives a complex product from another system consisting of different technological stages and including an element of advanced scientific developments, we consider the first system as a lower stage in intersystem interaction. In conditions of the same volumes of the manufactured product and the scale of the basic sector, the economic system with a large pioneer sector has the high potential for the emergence of competitive industries, because the volume and scale of the pioneer sector there is more significant there, it means that such a system will produce more pioneer products. However, the financing mechanism in such systems may be different. This means the formation and functioning of alternative types of economic systems. Despite this, competitive industries can be not only pioneer industries, but also basic sectors. At the same time, the products of the basic industries compete within their own technological orientation with other participants of the competition. However, competition takes the undue severity of competition when the product becomes special. This special product is produced and strives to the universal, thanks to the division of labor. At the industrial stage of development, such a product is already available and is able to change the consumer's life, but is not yet available to everyone.

The absence of competitors in interindustry competition is extremely rare in the production of products. It should be noted that in close connection with the characteristic of the presence / absence of competitors is such a characteristic as

the level of openness of the system. And here we turn to the interaction of the structural characteristic "competitors" with the characteristic "level of openness" of the system. By monitoring the allocation of both resources and benefits, at the level of the world economy, it is possible to identify both world's major economies and outsiders. In the two-sector model, the competing countries are countries with an already formed and successfully functioning pioneer sector [8]. All systems, according to the assumptions of the two-sector model, which are competitors, are aimed at producing a pioneer product, since it brings the greatest value added or an additional product and allows to move up the ladder of technological development, increasing the overall level of technological structure of the system. When a competitive industry of the pioneer sector arises, it can be assumed that it has no competitors. However, in reality, this situation is quite idealistic. The situation is much more typical when there are competitors at the level of different types of economic systems. At the same time, the values of the indicators of the system openness and the number of suppliers and consumers will not change, because the competitive products of the pioneer sector are aimed at maximizing the consumption by other participants in the global economic system. The formation of global manufacturers involved in the competition of production affects, first of all, the characteristics of intersystem interaction of basic industries. For the pioneer industry product, the structural characteristics of intersystem interaction do not change, since the focus on open markets and getting more profit will be a priority.

So, we found out that competition and the presence of competitors is one of the main structural characteristics that determine the place of the system in the intersystem division of labor and form, along with other characteristics, a planned or market version of the economic system. The relationship between this characteristic (competitors) and the type of economic system can be both direct and inverse. With a direct relationship, the system itself has an impact on competition. For example, in a planned economy with technological specialization of production, full-fledged competition between enterprises producing intermediate products is hardly possible. However, there is also a reverse interaction, when competition affects the formation of the type of system. And this aspect we examine comprehensively.

To achieve the purpose of the study, by strengthening the competitiveness of economic sectors in the basic, pioneer or both sectors, entailing a change of the ratio in the economic structure, three possible situations was carried out: 1) competitive industries arise in the basic sector of the economy; 2) competitive industries arise in the pioneer sector; 3) the simultaneous emergence of competitive industries in both sectors.

Thus, based on the model building of the first situation, the following conclusion can be drawn. The emergence of competitive industries capable of creating a

large amount of additional product in the sectors of the economy of the basic sector is a prerequisite for the formation of a planned type of economic system. When allocating resources in a centralized way through a nomenclature-volume mechanism, the basic sectors of the economy will produce the product most efficiently.

Let's consider the second situation, in which competitive industries arise in the pioneer sector of the economic system. In the production process, with the complete absence of competition, conditions arise for optimizing and reducing the surplus spent in the pioneer sector. However, in determining the efficiency of the use of resources allocated by the center, there will be quantitative characteristics. The planned economy system is characterized by closeness and limited competition, largely limited by rivalry in bureaucratic circles. Thus, the emergence of competitive industries in the pioneer sector leads to the formation of a market-type economic system. The competition that arises in this type of business contributes to the selection of highly profitable competitive samples of the manufactured product. This is the main condition for the reproduction of a unique product. Free pricing allows you to cover high costs and make a profit.

The third model reflects the situation in which competitive industries exist both in the basic and in the pioneer sector at the same time. The proposed model can exist in any conditions, which are different from the classical planned and competitive market economy. This model is advanced from the point of view of the economic system development. There are a large number of high-tech industries in this system, which increases the profit from the output of products. Long value chains create the largest number of jobs for the population. The system is capable of producing a competitive advanced product that is in demand among consumers. In the event of a change in the technological structure, it becomes possible to redistribute available resources at the expense of the resources of the basic sector. The propensity of the market to the pioneer sector allows creating the effect of stimulating the reproduction of a new product and screening out an illiquid one.

It should be noted that obtaining excess profits and an excess of resources in the production of a competitive product can create distortions in the structure of the system and entail destructive consequences. These factors are controllable in time and are determined by the availability of resources for the implementation of transformational processes. Consideration of the proposed models is designed to reflect the need to make changes in the process of interaction between structural components in the event of emergence of competitive industries. To create prerequisites for the formation of competitive industries, first of all, it is necessary to take into consideration the method of redistribution used by the economic system.

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进口替代：为什么进口替代的过程应该是连续的、准确定的和最优的

**IMPORT SUBSTITUTION: WHY THE PROCESS OF IMPORT  
SUBSTITUTION SHOULD BE CONTINUOUS, QUASI-  
DETERMINISTIC AND OPTIMAL**

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结果表明，进口替代过程应该是连续的、准确定的和最优的。提出了方法和工具，允许以最少的资源进行优先进口替代的商品的最佳选择，并加快在国内众多法人实体中寻找和合理选择商品制造商。

关键词：进口替代，连续过程，资源成本，资源强度评估，过程优化，国家安全

**Abstract.** *It is shown that import substitution processes should be continuous, quasi-deterministic and optimal. Methods and tools are proposed that allow, with minimal resources, to carry out the optimal choice of goods for priority import substitution and accelerate the search and reasonable choice of a manufacturer of goods among many legal entities within the country.*

**Keywords:** *import substitution, continuous process, resource costs, resource intensity assessment, process optimization, state security*

**Introduction**

It is known that international trade, active foreign economic activity of the state as a whole have a beneficial effect on the economy, on the socio-economic development of the country, on the standard of living of citizens. However, in the last couple of years, a number of countries in Europe, Asia and even South America have suddenly encountered problems and difficulties in the process of foreign trade. The reason was the mass refusal of the importing countries to accept the goods, and the exporting countries - to supply the goods. And all this happens despite the existing contracts. This situation had a very negative impact on the economies of these countries - an abrupt increase in inflation, a drop in GDP and the standard of living of citizens. It turns out that ultimately the population of the country, which has fallen into a very difficult situation, suffers.

Involuntarily, many questions arise: Why is all this happening? How to find a way out of this rather difficult situation? Is it possible to eliminate or reduce the likelihood of its recurrence in the future? And who and how should solve these problems in the first place?

Here we will try to narrow the problem by considering only one, extremely relevant part of it - the problem of import substitution. Today, many citizens and entrepreneurs are trying to solve this problem.

Of course, it is very good that both the citizens themselves and individual entrepreneurs are actively engaged in import substitution, involuntarily purposefully caring not only about their well-being, but also about the support of the people around them. However, their ideas, which arose by chance and were successfully implemented, their efforts, their desire to do something good and useful, as well as the efforts of the vast majority of people like them, unfortunately, will not be able to *noticeably positively affect* the country's budget revenues, the standard of living other citizens, will not increase the level of *security* of the state.

Currently, as far as we know, there are no methods and tools that allow, with minimal time and financial resources, to optimize the import substitution process according to the criteria specified or chosen by the researcher.

The article shows that the processes of import substitution need to be *optimized* (according to currently relevant criteria), they must be **continuous** and quasi-deterministic; at the same time, methods and tools are proposed, the use of which helps to *accelerate the processes of import substitution, reduce their resource intensity, and strengthen the competitive market positions* of the state.

### **1. How to make the process of import substitution continuous and optimal: methods and tools**

Let's consider some real situations. Let's assume that some exporting country has refused to deliver the goods, for example, the technical system  $TS_k$ . But after all, having received such news, it is important to assess how this *decision of the exporter* will affect the *economy, the standard of living of citizens, and the security* of the state?

What decisions and specific actions should be implemented as a *priority*?

Who should *make and implement these decisions*, and how quickly (what is the *margin of time*)?

It is obvious that, firstly, not one, but several and even many solutions are possible, and, secondly, depending on the **rank** of the chosen optimization criterion (from the group established by the top-level system), solutions can be different. For example, if the criterion "**state security**" has the highest rank and it is impossible to *replace the exporter*, then decisions should be made at the *highest level* of the country's management, *promptly* (minimum margin of time) and without strict restrictions on the required *expenditure* of necessary *resources*, etc.

If there are several exporters of goods and a number of contenders in reserve,

and the *share* of the *exporter* who refused to supply the goods in the total volume of trade is *small*, then the misunderstanding that has arisen can be easily resolved by fixed structures in the field of foreign trade policy.

Indeed, as can be seen from the situations considered, *the process of import substitution* should be *optimal* in each case according to a certain criterion, selected from a group of criteria formed, *ordered by degree of importance, significance for the country*. Let us pay attention to the fact that at the same time it is easy to single out a clear sequence of *almost deterministic* (quasi-deterministic, not random) actions of the *state* to *replace* imported goods with developments of its own *production* and/or to replace exporters.

The sequence of such actions should be *planned* in advance, *well before the occurrence* of any of the events such as the refusal of some exporter to supply the goods imported by the country.

To this end: before concluding an agreement-contract with the exporting country for *each* of the goods to be included in *the list of imported goods*.

1) an assessment is made of the direct and indirect *damage* that the country will suffer if the exporter refuses to supply, and depending on the magnitude of this damage

2) an action *plan* is formed to neutralize possible losses - two solutions: *firstly*, \*the composition of *applicant-countries* to replace the exporter is determined and, *secondly*,\* the composition of *applicants-legal entities* that are ready (*having an objective opportunity*) to implement the technological process for the production of imported goods within the country, and legal entities that are ready to provide the supply of materials and semi-finished products for goods manufacturers is determined;

3) a *comparative* assessment of the *time, labor and financial resources* spent on the implementation of each of the solutions to eliminate the consequences of a *potentially* unfavorable situation in the field of foreign trade is carried out (moreover, *taking into account the resource intensity of various options for organizing logistics processes when replacing an exporter - taking into account the use and various ways of delivering imported goods, and various vehicles*).

In the future, such a replacement may be due *not only* to the refusal of the exporter to supply goods, but also to the decision of the *state*

\*meet the domestic need for a product on its own through its production within the country or

\*become an exporter of this product, evaluating its capabilities (having discovered its "*comparative advantages*" over other exporters).

Now about why the process of import substitution should be *continuous*.

First, with the development of scientific and technical progress, fundamentally new technologies, new materials, and new products appear. A significant part of

the newly appeared developments and discoveries can be useful for the country's economy, for ensuring the *security of the state and citizens*, for improving the standard of living of the population. But the main thing is that, *using the new achievements of world science*, the country can be able to secure a "*comparative advantage*" over its exporting competitors and realize its own production of *previously imported* goods.

Secondly, periodically emerging positive "externalities", the so-called "technological overflows", may be of interest and, to a certain extent, stimulate the state to invest part of the development budget in new technologies, in the development and production of new promising goods, including *purposefully* and *continuously* implementing import substitution.

CONCLUSIONS. 1)None of the market participants, except for the *state*, will be able to *form and streamline* a list of actions for the *implementation* of a ***continuous and quasi-deterministic process of optimal import substitution*** of any product. After all, only the state has all the *information* necessary for such decisions, and *the ability to implement any decision that is very necessary for the country*, practically regardless of its resource intensity.

2)For optimal import substitution by *first* neutralizing the financial losses that the state is forced to compensate in case of refusal to fulfill the contract by one or all suppliers of imported goods, it is necessary to *rank the optimization criteria*, evaluating the *amount* of time, labor, material and financial resources *spent* on *potentially possible*, "emergency" import substitution.

## **2.What actions should be taken by the state for continuous and optimal import substitution.**

2.1. Express assessment of the amount of damage to the country when exporters refuse to supply goods imported by the country.

The procedure for implementing the optimal choice of the desired product from the list of imported goods to replace it (in the event of exporters' refusal to supply) with goods of own production (or by replacing the exporter) consists of two stages. At the first stage, an *express-assessment* of the amount of damage to the country and its citizens is carried out in case of an unexpected refusal of any of the exporters to supply goods included in the list of imported goods, i.e. a list of goods is formed for the implementation of the processes of priority, *first-priority* import substitution, and on the second, the *ranking* of imported goods is carried out according to the calculated amount of damage if exporters refuse to fulfill an agreement on the supply of goods needed by the country.

Proven methods can be used to complete both steps. So, if there is *reliable quantitative* information about the amount of damage from unexpected actions of exporters of goods, posing, for example, a *threat* to the *security* of the state, the method [1] can be used for an economically justified express assessment of the

amount of damage from the implementation of each threat. The method allows \*increasing the reliability of calculations due to the possibility of prompt rechecking them, \*expanding (for a top-level system) the possibilities of optimal selection of a particular exporter, promptly providing information about *which of the potential exporters and by what indicators* occupy a leading position. In addition, all calculations related to the processing of primary information and obtaining results can be performed automatically, centrally.

However, in a real situation, statistical data for the reasonable formation and selection of a subset of the main threats and for assessing the magnitude of damage are not always available. Under such conditions, the only possible solution seems to be the choice of a method focused on step-by-step refinement of the values of various indicators with an assessment of distribution characteristics (SRV-ADC). As part of the features of the method [2-5] \* integration of the *Delphi procedure*, usually used to predict the future, with expertise aimed at *obtaining the value of the desired indicator*; \*providing an opportunity for specialists participating in the examination to *consider objections and proposals* of other members of the expert group in an atmosphere *free from the influence* of the personal qualities of the participants, which contributes to the activation of the intellectual activity of experts. \*the ability to quantify the moment (step number) of the completion of the expert survey (by the magnitude of the change in the coefficient of variation). \*implementation of *feedback* during the examination process by informing expert experts about the results of the previous step; \*use of a program of *successive steps*, each of which implements a full cycle of expertise; \*approximation of the estimates of each expert, represented by *three values of the desired indicator* (*minimum, maximum and most probable value*) by a *triangular* distribution, and represented by two values (*minimum and maximum*) by a uniform distribution; \*the use of *simulation modeling* to determine the generalized collective opinion *n* experts as the average of *n* random variables having a *triangular or uniform* distribution (opinions of *n* members of the expert group); \*obtaining estimates of *statistical characteristics* (*mathematical expectation, variance, coefficient of variation, median, kurtosis, asymmetry*) and the *distribution of the values* of the desired indicator (in the form of a table and a histogram); \*the ability to *determine the probability* that the values of the indicator will not exceed a specific value or fall *within a specified range of values*.

Based on the listed features of the method, its *advantages* naturally arise: \*increasing the *accuracy of the examination results* due to: the *presence of feedback* during the implementation of each subsequent round; *providing* the expert with the *opportunity* to indicate three or two values of the desired indicator; *determination*, based on the results of simulation modeling, of the *probability* that the value of the indicator falls within *the specified range of values*. \**reducing the*

**psychological burden** on the expert and the negative impact on the results of the examination of the presence of superiors and/or ambitious personalities, since *anonymity is maintained, and the experts do not communicate with each other and do not know who gave a specific justification in defense of very different indicator values*. **\*representation of the total distribution** as the mathematical expectation of the sum of uniform or triangular distributions of the estimates of individual experts in the form of histograms and tables, statistical characteristics of the distributions makes it possible to obtain the resulting distribution of indicator values even **with a large dispersion of estimates and the condition** that experts indicate two or three values. **\*calculation of statistical characteristics of distributions** (mathematical expectation, variance, coefficient of variation, median, asymmetry, kurtosis) and tables of distributions provides an opportunity to estimate the probability that the values of the desired indicator will fall within the specified range. **\*identification of spontaneous groupings of experts**, whose estimates are close to the desired values of the indicator, makes it possible to investigate the reasons for the formation of such groups. The formation of expert groups is carried out on the basis of a given threshold value of the probability of a specific range of values of the predicted indicator.

The method is correct, tested many times, confirmed its usefulness in the process of use in various subject areas.

And if you use the method "Functional completeness with an assessment of the significance ("weight") of an object and its characteristics" [6, 7], you can \* identify the relationship between exporters by the degree of their possible mutual influence on the efficiency of import operations,\* form subgroups of exporters with approximately the same potential damage from their actions, \* analyze the reasons for the formation of such subgroups (see also [8]).

2.2. Formation of a list of potential manufacturers of imported goods for the subsequent selection of legal entities (hereinafter, legal entities) of legal entities-applicants for the manufacture of goods within the country. To this end, create a country-wide database containing information on the availability (composition, quantity and load level) of equipment (by type) for all legal entities registered in the country (by industry). This information is subsequently presented in the form of a table, including, among other things, the details: identifier and name of the legal entity, location, industry or agriculture, name (identifier) and availability (1 or 0) of equipment (by type), name (identifier ) and the amount of equipment (by type).

2.3. Formation of a list of existing and potential consumers of imported goods in the future (indicating the volume of consumption). The list contains the following details of consumers: identifier, name of the consumer-legal entity - store, warehouse, etc., quantity of goods consumed, location, etc.

2.4. Evaluation of \* the possibility of replacing the exporter and \* the resource intensity of such a replacement (taking into account the time and resources spent on logistics processes when using different ways and means of delivery of imported goods)

2.5. Comparative assessment of the resource intensity of the production of imported goods within the country.

Suppose that it is necessary to estimate the resource intensity of the production of a technical system  $TS_k$  - a car, a radio station, a laptop, ... For this purpose, "unpacking" (into parts) of the  $TC_k$  selected for the production of imported goods is carried out. Then, the possibility and resource intensity of production of each  $TS_k$  part from different materials and using different technological processes (TP) is evaluated. An assessment is made of the possibility of making the product, for example, cheaper or with more added value by expanding the range of functions, or an assessment of the economic feasibility of improving other characteristics of the consumer quality of the product  $TS_k$ . At the next stage, the composition of the equipment used in each TP option and an assessment of the resource costs (resource intensity) for the implementation of each TP option (taking into account the cost of materials, semi-finished products and the cost of improving the consumer quality characteristics of  $TS_k$ ) are determined. The method "Process-statistical accounting of resource costs" is used [9, 10].

The financial costs for the formation of the labor resources necessary for the implementation of each variant of the technological process are estimated in a similar way.

2.6. Formation of a list of legal entities-applicants for the production of  $TS_k$ . To do this, it is necessary first to assess whether the legal entity-applicant has the equipment, without which it is impossible to carry out the options for the technological process of manufacturing imported goods, and then select a group of applicants who are to some extent capable of producing goods  $TS_k$ . This problem can be solved using the method "Functional completeness of an object with an assessment of the significance of the object and each of its characteristics" and a software system [6, 7]. The method has a number of advantages, in particular, it allows, *with minimal time, financial and intellectual resources*: to compile a **complete list** of characteristics, functions, features implemented by **all** analyzed objects; assess the degree of interconnection of objects according to the composition of features; to systematize information about the **composition of characteristics, functions or features** of the objects under consideration (*existing and/or being designed*); determine the information "weight", the significance of objects and features; quantify the *degree of compliance* of the composition of characteristics, functions or features of a particular object with the *requirements of the user*; rank objects and characteristics, signs, factors (implement ordering) *according to the*

*critera of completeness, significance ("weight"); to expand for the consumer the possibility of optimal choice on the market of the objects-goods he needs by providing a list of characteristics, functions or features (consumer properties) of each product, and to the developers - to give the opportunity to determine the directions for improving the object they have created; form a group of objects that have the same composition of features, compare their prices and other characteristics of consumer quality.*

Groups of legal entities that have the necessary staff and material resources are similarly distinguished.

2.7. A comparative assessment of the total costs for the production of  $TS_k$ , for the delivery of goods to consumers and the choice of the optimal option is carried out according to the criterion of the minimum cost of resources for the process of manufacturing  $TS_k$  within the country and when replacing the exporter.

**Conclusion.** 1. It is shown that the processes of import substitution should be optimized according to a group of priority criteria, ordered from the standpoint of threats to the security of the state and minimization of damage to the socio-economic development of the country.

2. Proposed repeatedly proven methods and tools that allow with minimal resources to carry out the optimal choice of goods for priority import substitution and accelerate the search and reasonable selection of a manufacturer of goods among many legal entities within the country.

3. Substantially substantiates the thesis that the development of scientific and technological progress forces the foreign trade authorities of the state to make import substitution processes continuous and focused, focused on achieving a "comparative advantage" in the production of priority goods for import substitution, while strengthening the country's competitive market position, providing it with the opportunity to become an exporter of a constantly growing group of competitive goods.

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影响阿拉木图高等教育客户满意度的因素  
**FACTORS AFFECTING CUSTOMER SATISFACTION IN SPHERE OF  
HIGHER EDUCATION IN ALMATY**

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本研究的目的是确定哪些因素可能会影响在读学生中哈萨克斯坦大学专业的选择。本研究对相关专业的选择进行了文献回顾和大学内部分析。基于此信息的下一项研究将是针对两所大学的国际问卷调查。在这项研究中，确定了影响作为消费者的一部分的学生的满意度的关键因素。

关键词：学生选择，专业选择，教育项目选择，学生行为，商科专业。

**Abstract.** *The aim of this study is to identify what could be the factors that influence choice of a major at universities in Kazakhstan among enrolled students. For this study related to major choices were conducted literature review and inner analysis of the university. The next study based on this information will be an international questionnaire for two universities. In this study were identified key factors that influence the satisfaction of the students who are the part of the consumes.*

**Keywords:** *choice of students, choice of specialty, choice of educational programs, student behavior, business specialties.*

Over the last 5 years the growth rate of students across Kazakhstan has been decreasing, but increasing in large cities, especially Almaty, excluding 2019-2020. The decrease in the total number of students across Kazakhstan may depend on demographic, social, economic and cultural phenomena and factors. Therefore, this study assumes that students do not satisfy their preferences in the educational environment by studying in Kazakhstan. However, an increase in the number of students studying in Almaty and the Almaty region indicates a trend that this city is popular with university and college applicants. Therefore, we choose Almaty (and Almaty region) universities for further research.

The higher education system is seen as a market in which consumers purchase intangible goods and services. However, the differentiation of higher education institutions has created competence among themselves. Nowadays, higher edu-

cation institutions use marketing to attract and retain students and try to increase the value and brand value of higher education so that they can retain in education and improve. In order to attract and retain students, it is important to research their preferences, interests and conduct market research on new students and internal HEI analysis. Especially because of the COVID-19 outbreak, HEIs have had to shift from offline to distance and online learning and new factors have emerged that affect student satisfaction. Even now, students need more flexibility in attending classes. Factors affecting student satisfaction are important to understand because the world is changing and the new satisfaction variables now represent new features, and how they influence is our research question.

This study is relevant because at the start of 2022, young people in Kazakhstan face the urgent problem of not being able to find a job that satisfies them and to which they are loyal after graduation, a consequence of the fact that there is low satisfaction with their qualifications and therefore a high turnover of young people after graduation.

The dissatisfaction can be seen in interviews, comments of graduates who studied on state scholarships, who are legally obliged to work for 3 years after graduation strictly in their specialty starting from 2021 (refers to the law «On education» Ministry of Education and Science in Republic of Kazakhstan). In order not to work off the state scholarship, students go to various tricks as enrolling for a master's degree in Kazakhstan for deferred work off, as a master's student is exempted from working off the bachelor's degree. Also, an early, perhaps ill-considered, marriage for the birth of a child, which is also a respectful reason not to work for 3 years. In addition, to mention, Kazakhstan is witnessing an oversupply of young staff in the humanities (e.g. law, economics, journalism specialists in international relations, etc.) (According to the electronic portal [www.egov.kz](http://www.egov.kz)), which are in surplus in the market now, so they are struggling with finding the job related to their majors.

However, the demand from production, from the state for graduates of engineering, technical specialties is growing, but young people who entered on a grant for such specialties either worked in another specialty, or are expelled. The question is, why do they choose this specialty? The answers to this question will be sought through surveys of undergraduate students in all courses.

This study will use a survey for the students of economic business university. The aim of this study is to investigate the variables that influence the process of a student's choice of major.

According to the system of public services and online information [egov.kz](http://egov.kz) in Almaty there are 39 higher education institutions, primarily universities, which are accredited and open. Universities are the main next level of education after secondary school or special vocational colleges. However, during the COVID-19 outbreak, all educational institutions switched to distance or online learning. From

2021, it is moving to blended and offline modes of study. In this way, students have gained new knowledge that they can study partly online and at convenient times, so they can choose to work part-time during their studies.

The issue of influencing new clients to choose information and retain existing clients has become more relevant than ever, as competitors of HEIs have become online academies offering flexible schedules and quality training, such as Yandex Praktikum, SkillBox, Coursera and so on. The question is on two main fronts: how to win in flexibility and quality education where knowledge is fresh and relevant in time, as well as being able to provide more versatile and strong learning benefits in the offline campuses of higher education institutions. This is why the question of research into student satisfaction arises, in order to understand and shape consumer and customer behavior in choosing between majors (and from that, HEIs). Elliott and Shin (2002) investigated what student satisfaction is and this meaning is appropriate for this study: it is the student's subjective evaluation of factors or subjects in the university that evoke some feelings, associations related to the educational institution.

The literature review showed that most of the research has been conducted in a socio-cultural context within a country, suggesting that satisfaction varies from country to country, as the limitations of previous work were related to geographical issues, and this research was conducted inter-continental or inter-continental, at least between two countries. Next, students' satisfaction may differ across institutions related to the brand and brand value of where they study. Therefore, we cannot apply what really matters to students if we do not know the specifics of each HEI. Thus, the gap in this research concerned Kazakhstani educational institutions, especially Almaty. The forthcoming work will complement existing work so that a global understanding of student satisfaction can be explored on a global scale.

In Kazakhstan, students study between 2 - 2,5 years (“Bakalavriat so Srokom Obucheniya v 2,5 Goda Poyavitsya v Kazahstane,” 2022) and 4 years to obtain a bachelor's degree in higher education. For all 4 years, the student is treated as a client. Therefore, it is necessary to measure student satisfaction. Previous studies on student satisfaction used a specific framework called SERVQUAL (Parasurman et al., 1988), but it was criticized by the authors (Asubonteng et al., 1996; Aldridge and Rowley, 1998) for several years until there was a new transformation of the existing framework. Questionnaires, surveys are commonly used to understand students' preferences and levels of satisfaction.

If we take the survey based on Douglas et al (2006) study, we can use the service-product nexus, which divides the survey into 3 main parts: things that exist in the university as special facilities, explicit service as services that can be provided through academic staff, and implicit services aimed at emotional intelligence and

individual approach to each student in the time available. This has been proven by other researchers such as Elliott and Shin (2002) and Weerasingh and Fernando (2017).

Satisfaction is mainly seen as a positive attitude towards something assessed (Navarro et al., 2005). And it is one of the wishes of universities that students should stay at university for all years of their studies. As mentioned above, student satisfaction can vary from one culture to another. While two factors were found to influence student satisfaction on the personality trait group like age, gender, grade point average, etc., the second factors are related directly to the university like quality of lectures, feedback, etc. Appleton-Knapp and Krentler, 2006).

However, in Finland, the quality of study materials and the quality of lectures are the main and most important factors for students' satisfaction at their universities (Karna and Julin, 2015). Whereas in Norway, most subjects such as the curriculum and the hospitality of the city in which the university is located are the main sources of satisfaction (Hansen and Solvoll, 2015).

Regarding Central Asia, students in the United Arab Emirates prefer quality lectures with high-tech tools and resources that would be available to students during their studies (Wilkins and Balakrishnan, 2013). In the Eurasian context, Armenian researchers (Martirosyan, 2015) have also investigated this issue and identified key elements as curricula and university services, but the findings refer to a negative correlation between the teaching style of teachers and assistants and student satisfaction. In East Asian studies (Pathmini, et al., 2014) in Sri Lanka, it was found that human factors such as reliability and empathy mainly influenced student satisfaction. Interestingly, in New Zealand, social interactions such as communication with the community, accommodation, cultural aspects and sense of security were most important to clients (Andrea and Benjamin, 2013).

So, how customer satisfaction applies to higher education. It can be seen from the literature review that the SERVQUAL survey has been used mainly by different researchers (Khan et al., 2011; Pathmini et al., 2014). However, the use of the business tool in non-profit educational sectors has been criticized by researchers such as Teas (1992), Asuboteng et al. (1996), Waugh (2002). The reason for this criticism has to do with service, which is difficult to measure as universities offer intangible benefits. Quality of service is a product of satisfaction (Bolton and Drew, 1991). Satisfied students' behavior is related to an investment in themselves and they are satisfied with their academic performance. However, we should be aware that SERVQUAL is mainly concerned with educational institutions and university facilities and how they affect students. But, as mentioned above, some students are satisfied when they have a social community which may consist of non-academic staff or other students who are also clients of the same university. SERVQUAL was therefore not sufficient to measure the sociological factor and

this gap was filled by the following. More recently, other methods have been developed to measure student satisfaction, such as the Noel-Levitz Student Satisfaction Index, which measures the social part of students. , student support centres, etc., as well as Service Product Bundle, SERVPERF and HeDPERF (Weerasinghe and Fernando, 2017). The most comprehensive method was developed by Elliot and Sheen (2002) when they proposed adding 116 indicators and 11 dimensions to measure student satisfaction. These dimensions dealt with campus, individual approach, academic and staff performance and so on. This survey method was further developed in 2006 with the Service Product Bundle (Douglas, 2006). One recent model is the Satisfaction Framework, developed in 2015 by Thor-Erik Sandberg Hanssen and Gisle Solvoll, which explains the influence and relationship of two main models: the object model and the satisfaction model. The object model focuses on the facilities in the university and/or campus that have a strong influence on student satisfaction, so it is explained as a dependent variable of the facilities. In this framework, a satisfactory model is developed to explain how different factors affect student satisfaction. However, as we observed, even if the focus is on physical objects rather than academic and learning goods, this is an excellent new perspective to identify new variables and find correlations between them.

As we understand it, researchers can apply all these models to fully understand the concept of student satisfaction and the factors that influence it. Research shows that the same variables and the same surveys in different parts of the world can show different relationships with each other. Thus, educational institutions are unique in their own way and therefore Gruber et al. (2010) said that it is all about students' subjective perceptions, which change from time to time depending on location and university. Thus, case studies can be a collection for empirical research to find out the trend in recent times or any other projects.

Research methodology. A quantitative research method was used to gather information because structured data can be obtained through this method. To begin with, a list of the population of university from the academic year 2019-2021 was obtained. This list had information about the number of students, undergraduates, doctoral students and international students who entered and are studying in certain majors and divided among themselves by language sections and by courses. The selected specialties were those that are popular at university and have more than 100 students in the stream.

After identifying trends in popular specialties at university, a survey was compiled. All variables were tested in previous studies published in Scopus-based journals. The questions were developed on the basis of previous studies that were verified. The questionnaire was developed in Russian but was translated from English.

The general population is this university students and the sampling unit is all

those studying at university at a given time, as they are Generation Z. The sampling frame is the lists of students studying at university. The sample size was calculated by calculator method through the website <https://socioline.ru/rv.php>. The type of sampling method is random selection. The sample size is 353 undergraduate students.

A simple questionnaire was then created, as the first questionnaire did not successfully pilot tested with an adult audience. The questionnaire for the current survey is attached in pdf format. All questions were designed on the Google Forms platform. Filling it out was individualized. The first pilot survey was done on 13 students who were randomly selected. 12 of them had in common that they were studying at university. They also sought help from the Dean's Office of the faculty of basic higher education of university.

As a result of the pilot survey, the following data was found:

The majority of respondents, 60%, were 3rd year students. Only 1st and 4th year students were contacted further. 84.6% of the interviewees were undergraduate students and the remaining 15.4% of the interviewees were master's and doctoral students.

The questionnaire itself contained sentences in the affirmative form. Respondents were asked to indicate how much they agreed with the statement from 1 to 5, where 1 meant "Strongly disagree" and 5 meant "Strongly agree". Thirty-three responses were received for the first time due to the time limitations. However, it has to be continued further to get all the responses related to the research. A correlation analysis was performed to see if there was a relationship between the variables. For this purpose, a data analysis package in Microsoft Excel was used. It turned out that the most positively correlated variables are those related to student employment. That is, if a student chooses a speciality, he/she makes a forecast for the future based on work skills, salary and career opportunities.

*Conclusions.* It turned out that the most positively correlated variables are those related to student employment. That is, if a student chooses a speciality, he/she makes a forecast for the future based on work skills, salary and career opportunities. In this study it was important to identify the factors related to student satisfaction with the university and then to test the major choice of the students at university.

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简化刑事诉讼程序的特点  
FEATURES OF SIMPLIFIED CRIMINAL PROCEEDINGS

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在本文中，作者研究了简化刑事诉讼程序实施过程中证据形成的特点。

作者试图找出最成问题的问题，并通过修改刑事诉讼法制定解决这些问题的方法。

关键词：程序形式，调查，调查的缩写形式，证明，调查员，证据的形成。

**Abstract.** *In this article, the authors study the features of the formation of evidence in the course of the implementation of simplified criminal procedural proceedings.*

*The authors make an attempt to identify the most problematic issues and develop ways to overcome them by amending the criminal procedure legislation.*

**Keywords:** *procedural forms, inquiry, abbreviated form of inquiry, proof, investigator, formation of evidence.*

To date, scientists, practitioners, lawyers are unable to come to a consensus on the question of whether modern criminal proceedings need an abbreviated form or not?

The simplification of the criminal procedural form, in our opinion, is a positive phenomenon, since its content contains a good goal, which is to accelerate and increase the effectiveness of the administration of justice [4, p. 132]. Moreover, simplified proceedings are useful for the criminal process, as they allow for its flexibility and speed.

Analyzing the role of simplified proceedings, it can be argued that its application will at least increase the efficiency of criminal proceedings, reduce procedural time, as well as compensate for moral harm and material damage as soon

as possible [6].

Consider and analyze the cases in which, in our opinion, the use of simplified forms would be appropriate.

Firstly, in accordance with the criminal procedure law [5], information obtained during the verification of a crime report can be used as evidence, however, in cases where, after the initiation of a criminal case, for example, a petition is filed for additional or repeated forensic examination, then such a petition is subject to satisfaction.

Thus, in the framework of the case we have considered, we can conclude that after a criminal case has been initiated, many procedural actions often have to be duplicated.

Based on the analysis of practical activities, this thesis is confirmed, since in practice there are quite frequent cases when, as part of the verification of the materials, forensic examinations are appointed and carried out, but later, after the initiation of a criminal case, the defense filed motions. The expert, in turn, in such cases, as a rule, is guided by the materials of the conclusion already given by him - all this perfectly illustrates the thesis that there is a duplication of procedural actions, which in fact delays the time, but does not bring any useful and significant results.

Secondly, as part of the analysis of practice, we also found that in many cases, when during the pre-investigation check, authorized persons received explanations, their content is in many respects similar to the protocols of interrogations.

If the content of the interrogations essentially duplicates the content of the explanations and does not differ in any way, what is the rationality of these actions? In addition, frequent appeals to participants in criminal proceedings on the same issues often cause dissatisfaction, resulting in a negative attitude towards the subject of the investigation, which sometimes leads to opposition, in the form of a refusal to testify, or the giving of formal testimony that does not specify the data in any way earlier and will not help the investigation in any way.

Having examined the practical component, we can say with full confidence that the ongoing interrogation only in extremely rare cases allows us to increase the degree of reliability of the primary information that was previously obtained as part of the pre-investigation check.

The problems that are increasingly being encountered in practice prompted the legislator to create a new reduced form of pre-trial proceedings: a reduced inquiry, but it should be said that the new format of inquiry also has a number of negative and ill-conceived factors.

Thus, within the framework of the investigation in an abbreviated form, the theory of evidence acquired a rather interesting evaluation category. The collection of evidence in a criminal case is carried out to the extent that is only the necessary minimum, however, based on traditional ideas of sufficiency, then, in our opinion, in this case there is a significant reduction in the level of requirements

for proving facts. This is explained by the absence of disputes and contradictions between the parties, however, if the accused suddenly decides to change his testimony in the case, then in this case the preliminary investigation body should have evidence that would confirm the accusation and prevent the guilty person from evading responsibility.

Continuing the study of problematic points of proof in the framework of reduced proceedings [2, p. 11], we are faced with a provision that contains information that the investigator or interrogating officer has the right not to interrogate persons who, during the verification of a crime report, gave explanations. In this case, a very logical question arises: how will this factual material be evaluated by the court? Since today, in the criminal procedure legislation there are no indications for the announcement of the explanations of eyewitnesses of the crime.

How, in this case, will the situation be resolved in court if there are doubts about the reliability of the messages contained in the explanation of the eyewitness of the crime? Will the court be required to interrogate this person? And if it is impossible to do this, the document will lose its probative force?

Another problematic aspect, in our opinion, is the peculiarity of the formation of evidence, since it is quite often of a secondary nature. Thus, the investigator often makes only a formal contribution to the process of forming evidence, drawing up in the procedural documents the materials of the "pre-investigation check" and the results of the ORD.

Moreover, one of the mandatory elements of the formation of evidence during the preliminary investigation is the preparation of an investigative protocol. In some scientific works, one may come across the opinion that the protocol of an investigative action cannot be attributed to an independent type of evidence [3, p. 110]. We agree with this point of view, since the protocol of the investigative action is very imperfect and at the present stage it is an ineffective means of securing evidentiary information. We believe that in the twenty-first century - the century of information technology, it would be reasonable and effective to supplement the protocol of an investigative action with a video recording of the actions of the investigator, since with the help of it becomes possible to certify the legality of the actions of the investigator, as well as fixing all the information that was discovered by the participants in the investigative action. A similar point of view is shared by many scientists. So, for example, A.S. Alexandrov and S.I. Kuvychkov, analyzing this topic in his writings, proposes to make a transition from written to electronic records management within the framework of the criminal process, using video recordings instead of protocols [1, p. 48-49]. We support the proposal to make a revolution in office work by changing the institution of criminal procedure documentation.

Summing up the above, we can highlight some provisions for improving the

legislation of the Russian Federation in the form of an abbreviated inquiry in criminal cases:

1. Fix the provision that the means of fixing the actions of participants in investigative and other procedural actions should be video recording. According to our plan, the video recording of investigative and procedural actions itself will be evidence in a criminal case. This provision will reduce the number of procedural documents drawn up by the interrogating officer and the timeframe for investigating a criminal case in the form of an abbreviated inquiry.

2. Fix the provision that the seized video during the inspection of the scene of the incident, operational-search activity, is examined on the spot, which is noted in the protocol of the inspection of the scene, in another document. In the future, during the investigation of a criminal case, an additional examination of the seized video recording is not required. This provision will reduce the number of procedural documents drawn up by the interrogating officer, the timeframe for investigating a criminal case.

3. Fix the provision that the explanations received during the pre-investigation check, during the investigation of criminal cases in the form of an abbreviated inquiry and not requiring clarifications and additions, can be announced at the court session. Thus, the duplication of verification and investigative actions in the framework of the production of an abbreviated inquiry will be prevented.

The need to introduce this kind of changes can also be justified on the basis of an analysis of the results of the operational activities of the inquiry units.

Thus, analyzing the dynamics of the results of the work of the inquiry units for 2018, 2019 in the Volga Federal District, we can say that in 2019 the share of criminal cases returned for additional inquiry and by the court to the prosecutor in accordance with Article 237 of the CCP RF increased by 0.3%. A high proportion of criminal cases of this category was noted:

- in Astrakhan LD - 6,4%,
- in Ulyanovsk LD - 3,6%,
- in Volgograd LA - 3,7 %,
- in Nizhegorodsky LA - 3,0%.

Understanding the reasons for the return of criminal cases, we come to the conclusion that some of them can be eliminated by the proposed changes. So, for example, one of the reasons for the return of criminal cases is technical errors and inattention in the preparation and execution of procedural documents (in 2019, this reason served as the basis for the return of 12 criminal cases, which is 28.6% of the total). Our proposal to consolidate the thesis that the seized video recording during the inspection of the scene of an incident or operational-search activity should be examined on the spot, with a subsequent note in the protocol of the inspection of the scene or in another document will reduce the number of procedural

documents drawn up by the investigator, which in turn will reduce the workload of the interrogator and, as a result, the technical errors he makes when compiling certain procedural documents.

Another reason for the return of criminal cases is procedural violations in the course of ongoing investigative actions (in 2019, this reason served as the basis for the return of 22 criminal cases, which is 52.4% of the total). Our proposal on the need to consolidate the thesis that video recording should become a means of fixing the actions of participants in investigative or other procedural actions, as well as operational-search activities, will significantly reduce this kind of reason, since video recording allows you to certify the legality and technical correctness of the actions of the interrogating officer, which will encourage the investigator to act within the legal framework when conducting investigative actions.

It should also be noted that in the first six months of 2020, the number of criminal cases returned by the prosecutor for additional inquiry, redrawing of the indictment by the court increased by 83.3%, and their share of the number of completed ones amounted to 3.7%.

In view of all the above, based on an analysis of the results of the operational activities of the inquiry units, we were able to identify certain imperfections and shortcomings that are typical for the investigation today. We are convinced that the amendments proposed by us, which will improve the criminal procedure legislation of the Russian Federation, can contribute to their liquidation.

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执法数字化转型背景下测谎仪在打击毒品犯罪中的应用  
**THE USE OF POLYGRAPH IN COMBATING DRUG CRIME IN  
THE CONTEXT OF DIGITAL TRANSFORMATION OF LAW  
ENFORCEMENT**

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本文致力于在执法数字化转型的背景下使用测谎仪打击毒品犯罪的前景。对国外使用的创新测谎仪以及俄罗斯改编的类似物进行了审查。讨论了使用非接触式测谎仪打击毒品犯罪的可能性。该出版物的目标读者是上合组织成员国的执法人员。

关键词：测谎仪；测谎器；创新的打印设备；非接触式测谎仪；心理生理测谎；毒品犯罪；执法；数字化转型。

**Abstract.** *The article is devoted to the prospects of using the polygraph to counter drug crime in the context of the digital transformation of law enforcement. A review of innovative polygraph devices used abroad, as well as Russian adapted analogues, is carried out. The possibility of using non-contact polygraph devices to counteract drug crime is discussed. The target audience of the publication are law enforcement officers of the SCO member states.*

**Keywords:** *polygraph, lie detector, innovative polygraph devices, contactless polygraph, psychophysiological lie detection, drug crime, drug trafficking, drug-related crime, law enforcement, digital transformation.*

Currently, in the context of the digitalization of law enforcement activities abroad, polygraph devices are increasingly being introduced into the integrated security system<sup>1</sup>. Usually, a polygraph ("poly" in Greek means "many", "graph" – "writing") is a device designed to simultaneously record several physiological indicators. To fix these indicators, sensors are used, while in the classic (contact) polygraph device, the sensors are attached to the body of the subject. In innovative

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<sup>1</sup> Belykh-Silaev D.V. Foreign experience in the use of polygraph devices in law enforcement in modern conditions // Collection of scientific papers "Activity of law enforcement agencies in modern conditions". – Irkutsk: VSI MIA of Russia, 2021, P. 23-27.

(non-contact) polygraph devices, classical sensors are replaced by systems that allow recording physiological parameters non-contact and remotely, for which video cameras, microphones and bioradars are used, which opens up wide opportunities for using these devices not only for questioning using a polygraph, but also for observation, including to counteract drug crime by identifying persons involved in drug trafficking, as well as drug addicts<sup>2</sup>.

In Russia and abroad, such non-contact polygraph devices have already been used, such as "VibraImage" (Russia) – a non-contact polygraph device that analyzes the movements of body points in space; "EyeDetect" (USA) – an innovative polygraph device (eye-tracker) based on the analysis of oculomotor reactions; "HireVue" (USA) – non-contact polygraph device based on the registration and analysis of hand and body movements; "Affectiva" (USA) – non-contact polygraph that registers facial expressions; "Beyond Verbal" (Israel) – a non-contact polygraph that analyzes the tone of speech; "AutoEmotive" (USA) is a non-contact polygraph that registers facial expressions using video cameras, and using a bioradar to register heart rate<sup>3</sup>. The police in Spain use the "VeriPol" software package to check the accuracy of the information reported<sup>4</sup>. At transport infrastructure facilities in the European Union, the non-contact polygraph device "iBorderCtrl" is used, which since 2016 has been located at the external borders of the European Union, which is also used by customs. Non-contact polygraph "iBorderCtrl" is based on the registration and analysis of non-verbal signaling such as facial expressions, pantomime of the observed person. The cost of the "iBorderCtrl" project amounted to 4.5 million euros, however, in 2019, the European Commission indicated the need to further improve the technology of contactless polygraph devices<sup>5</sup>.

Significant work on the improvement of non-contact polygraph devices was carried out at the Research Institute of Multiprocessor Computing Systems named after Academician A.V. Kalyaev by a complex scientific group led by Academician of the Russian Academy of Sciences, Doctor of Technical Sciences I.A. Kalyaev, where a non-contact polygraph was developed, which took into account the shortcomings of existing polygraph devices and *was successfully tested at transport infrastructure facilities, in crowded places, at checkpoints to identify people who are in a state of drug intoxication, as well as those trying to smuggle with*

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2 Deulin D.V., Belykh-Silaev D.V., Bogaevsky V.A. Psychological significance of reservations, body movements and facial expressions of the subject in the framework of polygraph testing // Psychology and Pedagogy of Service Activities. № 2. – M.: MoSU of the MIA of Russia, P. 31-37.

3 Belykh-Silaev D.V., Korovin Ya.S., Kalyaev I.A. Possibilities of using artificial intelligence in law enforcement // Collection "Digital Police. Information and Communication Technologies". – M.: STiS MIA of Russia, 2021, P. 27-29.

4 Information letter of the Representative of the MIA of Russia in Spain dated 16.03.2021 № 82 "On the use of the polygraph in Spain".

5 Information letter of the Representative of the MIA of Russia in France dated 16.03.2021 № 30 "On the use of the polygraph in the EU".

*drugs through checkpoints.*

The structure of a non-contact polygraph includes:

*firstly*, video cameras that record a video image of persons located at transport infrastructure facilities,

*secondly*, block for detecting biometric and psychophysiological signs of deviant (deviant) behavior,

*thirdly*, block for identifying persons with deviant behaviors.

In this case were used such artificial intelligence technologies as:

*firstly*, cognitive maps,

*secondly*, convolutional neural networks,

*thirdly*, neuro-fuzzy analyzer<sup>6</sup>.

The developed non-contact polygraph device can operate non-contact and remotely, based on the analysis of the parameters recorded by the video camera, in two zones: near (up to 3 meters) and far (up to 100 meters).

*In terms of observing behavior in crowded places, non-verbal information is the most informative.* The modern structure of non-verbal means of communication includes 5 blocks: first, *kinesics* (optical-kinesthetic system of non-verbal signaling, which includes gestures, facial expressions, pantomime, gait and visual contact); secondly, *tacesics*, which includes dynamic touching in various forms, including handshakes, patting, pushing, kissing, etc.; thirdly, *proxemics*, which refers to the features of the spatial and temporal organization of communication (how the interlocutors position themselves in space, at what distance, in what positions, at what angle in relation to each other they are, how their location in space changes during communication, including when presenting certain stimuli - questions, illustrative material, etc.; time of communication, i.e. the duration of contact, the desire of the interlocutor to get out of contact upon presentation of certain stimuli, etc.); fourthly, *paralinguistics*, that is, the rhythmic-intonational system (change depending on the stimuli presented during communication in pitch, voice volume, timbre, voice intonation, strength and range of voice); fifthly, *extralinguistics*, i.e. the inclusion of various inclusions in speech (laughter, crying, pauses, sighs, coughing, stuttering, their determinism by stimuli presented during communication)<sup>7</sup>. Modern non-contact polygraph devices based on artificial intelligence systems can register and analyze these characteristics of non-verbal communication, which turns the polygraph into a recorder of non-verbal information.

Non-contact polygraph device developed under the guidance of Academician

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6 Klimenko A.B., Korovin I.S. A technique of deviant behaviour detection in video surveillance systems based on complex behaviour analysis // Journal of Physics: Conference Series. – IOP Publishing. 2020. – V. 1661. – N 1. – P. 012050.

7 Belykh-Silaev D.V. Polygraph as a registrar of non-verbal information in a legally relevant situation (to the question of the scientific validity of the psychophysiological method of lie detection) // Legal Psychology. № 1. – M., 2018. P. 23-29.

of the RAS I.A. Kalyaev, is capable of detecting (determining) *in the far zone (up to 100 meters)* the following events: firstly, static crowds of people, secondly, fights (by determining, using artificial intelligence systems, the intersections of the coordinates of certain parts of the body of different persons); thirdly, sudden sharp intersections of people that do not coincide with the direction of movement of the main stream, including those caused by a state of drug intoxication<sup>8</sup>. In a pandemic, social distancing by citizens in public places is of great importance for ensuring safety. Artificial intelligence systems in the developed polygraph device are capable of real-time detection and timely notification of the operator of the polygraph device about violations of intervals and distances established to prevent the spread of coronavirus infection<sup>9</sup>.

Approbation of the non-contact polygraph device in Taganrog also showed its effectiveness in *the near zone (up to 3 meters)*, where the polygraph, being installed at the checkpoint, successfully timely determined and correctly interpreted such indicators of increased stress as the dynamics of oculomotor reactions (direction of gaze, frequent change in the direction of gaze, "running glance", look at the floor); auto communication (constant whispering); attempts to hide your face (lower your head, turn away, cover your face with your hands or some object); raising hands up for a long time; change in gait, stumbling, falling; an attempt to hold an object in two hands in front of him; an attempt to hold a hidden object under clothing (the hand is pressed to the body), etc. Detection using a non-contact polygraph of these non-verbal signs made it possible to identify persons in a state of drug intoxication, as well as to stop attempts to carry drugs through checkpoints.

Thus, the polygraph acts as a registrar of non-verbal information, which is analyzed in real time by the artificial intelligence technologies used in the polygraph device, promptly transmitting to the polygraph operator information about the signs of deviant behavior of a particular person or group of persons, which allows law enforcement agencies to focus on these individuals in a timely manner, which opens up broad prospects for the use of the polygraph to counter drug crime in the context of the digital transformation of law enforcement.

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高校音乐课程“思想政治理论课全课教学”模式研究  
A STUDY ON THE "IDEOLOGICAL AND POLITICAL THEORIES  
TEACHING IN ALL COURSES" MODEL OF MUSIC CURRICULUM IN  
COLLEGES

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“立德树人”是高校教育的根本任务。“思想政治理论课全课教学”的本质是立德树人，德育的改革与发展已成为高校重要的研究方向。在大学音乐课程中，应将课程与思想政治教育相结合，增强思想政治教育的内涵。从而积极引导当代学生继承和创新中华优秀传统文化，树立正确的民族观、民族观、历史观和文化观。把学生培养成中国特色社会主义合格建设者和可靠接班人。

关键词：音乐表演；全部课程的思想政治理论课教学；教育改革；实践活动

**Abstract.** *"To foster virtue through education" is the fundamental task of college education. The essence of "ideological and political theories teaching in all courses" is to establish moral education, and the reform and development of it has become an important research direction for colleges. In college music curriculum, courses should be integrated with ideological and political education to enhance the new connotation of it. Thus, it can actively guide contemporary students to inherit and innovate the excellent Chinese traditional culture, establish correct national, ethnic, historical and cultural views. Then cultivate students into qualified builders and reliable successors of socialism with Chinese characteristics.*

**Keywords:** *Music performance; ideological and political theories teaching in all courses; educational reform; practical activities*

In December 2016, the National Conference on Ideological and Political Work in Colleges was held. In the conference, Xi Jinping pointed out that "the ideological and political work of colleges is related to the fundamental issues of what kind of people do colleges cultivate, how to cultivate them and for whom to cultivate them". Under the guidance of President Xi Jinping, the direction of China's higher education reform has made an important change from "ideological and political courses" to "ideological and political theories teaching in all courses". The college education curriculum system has taken up the historical mission of ideological and political education for students in the process of "ideological and political theories teaching in all courses". Gradually, it has become the focus of China's college education curriculum reform. Under the vision of "ideological and political theories teaching in all courses", exploring the teaching contents and methods of college courses and integrating them with ideological and political education has become a subject of great importance and in-depth exploration for major art colleges. This paper refers to the "ideological and political theories teaching in all courses" which is integrated with music education. It does not refer to a specific course, but is an educational concept innovation that should be based on practice, active and innovative thinking. By deeply exploring the connotations and factors of moral education in professional courses and comprehensive literacy courses, to promote the integration of explicit and implicit education, thus realizing the unification of knowledge transfer, value shaping, and ability cultivation in multiple ways.

## **Chapter 1 Current situation and problems of music education in colleges**

### **1.1 Teachers' Insufficient attention to ideological and political education**

Since the idea of ideological and political theories teaching in all courses was proposed, it has become an education concept emphasized in colleges around the country. Even though the state and schools vigorously promote the importance of the idea every year, most teachers do not pay enough attention to students' ideological and political quality education because they lack practical experience. They put their educational focus and energy on music teaching and research work, including teaching music theory courses, guiding students' daily professional training, and organizing participation in various performance activities, while neglecting students' ideological dynamics, outlook on life and values. Some teachers, even if they recognize the importance of ideological and political education in music teaching, fail to effectively integrate the ideological and political elements into the actual music teaching work, but teach students in the form of boring theoretical discourse. Even if some teachers realize the importance of ideological and political education in music teaching, they can not effectively integrate those elements into the actual teaching, but teach students in the form of boring theoretical discussion, resulting in students' boredom. The effective value of "ideological and political teaching in all courses" cannot be really brought into play, thus leading to the decline of students' interest in learning and weakens the influence of ideologi-

cal and political education.

### **1.2 Music education tends to be utilitarian**

With the development of the times, people's demand for spiritual and cultural level is increasing day by day, and there are more and more students majoring in art. At the same time, teachers' understanding of music has tended to be utilitarian because of the influence of the social environment. Instead of training students simply to cultivate their moral character and improve their artistic and aesthetic abilities, more emphasis is placed on students' achievements in various artistic events. In the process of pursuing fame and fortune, students gradually forget their original intention of learning art, and their interest and enthusiasm for art is worn out. This utilitarian goal of talent training gradually weakens the aesthetic ability of teachers, and their knowledge and teaching ability declines. If they can't correct their wrong ideas in time, teaching will become even more utilitarian and dilute their artistic accomplishment and aesthetic ability.

### **1.3 Disjointed education of knowledge and thought and students' lack of ideological and political elements**

At present, most colleges take ideological and political theory courses as the core of moral education. Ideological and political courses are clearly separated from professional knowledge lectures, with the former focusing on ideas and the latter on subject knowledge. This fragmented education approach fails to achieve good results. Not only does it fail to integrate the ideological education into the curriculum, but it may also cause some students to have a certain resistance to ideological education. They will fail to recognize the importance of ideological construction and think that the reform of curriculum thinking and political education has destroyed the artistic beauty of music courses.

## **Chapter 2 Effective ways to integrate “ideological and political theories teaching in all courses” and music education in college curriculum**

### **2.1 Attach great importance to ideological and political education and cultivate ideological and political consciousness comprehensively**

“To foster virtue through education” should not only establish moral norms, but also set up correct values. In order to cultivate excellent successors of socialism and carry forward the fine moral character of the Chinese nation, we must establish and strengthen the sound atmosphere. Education background and knowledge do not represent the level of moral quality or the quality of values, and subject knowledge is inseparable from the spiritual value it contains. The two educational goals of “moral education” and “cultivating people” must be closely linked. Ideological and political theories teaching in all courses has injected new power into the overall development of teachers and students.

The reform of ideological and political theories teaching in all courses in colleges requires that all professional courses should give full play to the function

of educating people. Taking "to foster virtue through education" as the basic task of moral education, it imperceptibly realizes the guidance of students' values and the implementation of ideological education. The construction of music ideological and political theories teaching in all courses is to take into account the value-oriented leadership of teachers while cultivating music literacy and teaching music knowledge, and build a bridge between subject knowledge and social life. Its construction advocates the exploration of ideological and political elements in all disciplines, and the organic combination of ideological and political elements and disciplinary professional knowledge, so that all professional courses and disciplines can fully fulfill their educational functions.

At the same time, incorporating professional courses teachers into the team of ideological education makes them a new force for cultivating talents and makes up for the deficiency of moral education in colleges. On the premise of following the law of physical and mental development of college students, the organic combination of disciplinary knowledge education and ideological guidance, and the integration of ideological and political elements into various professional courses can accelerate the pace of teaching reform in colleges and realize collaborative education. The integration of music education and ideological and political theories teaching in all courses can promote the cultivation of students' thinking ability and innovation consciousness, advance the construction of socialist spiritual civilization, and thus promote the cultivation of innovative talents.

## **2.2 Reasonable setting of course content and careful selection of course materials**

The teaching content of music courses is closely related to the teaching materials, and high-quality teaching materials can combine music knowledge and ideological and political education. When choosing music teaching materials with ideological, contemporary and artistic qualities, colleges should combine the teaching needs of the course and choose carefully. For example, by choosing Huangshui Ballad from The Yellow River Canchorus, the teacher can help students better understand the music and cultural knowledge contained in the song and better guide them to sing. "Music is an expression that transcends words".

Revolutionary songs, national operas and songs of the times with ideological, contemporary and artistic qualities are selected and arranged. In that era, revolutionary songs could express the enthusiasm and vigor of self-confidence and self-improvement, showing the courage of young people to sharpen their will and transcend themselves. They witnessed the growing prosperity of the Party and the country, and were an indispensable spiritual treasure in people's lives. At different stages of development, the revolutionary national songs show strong political colors, inspire the will of the Communists, stimulate optimism and show the spirit of unity and cooperation. It is of great practical significance to promote the ex-

cellent Chinese traditional culture, guide students to sing Chinese revolutionary songs, inherit the spirit of the Chinese Communists, and strengthen the ideological and political education of students, especially for the young college students majoring in music performance.

Through school teaching, campus cultural activities and social practice activities, the charm of revolutionary songs is given full play. Thinking creatively about new teaching methods for ideological and political education of art majors in the new era is conducive to the combination of professional teaching and students' ideological and political education work, thus enhancing the effectiveness of students' ideological and political education. Also, national opera can be taught as an art class, allowing students to enjoy classical songs and experience the deep emotions of the works. Music and ideological education should keep pace with the times and update the teaching materials at the right time, so that students can feel the infection of emotion and positive thoughts in the process of music learning, thus actively promoting ideological and political education.

### **2.3 Build a moral and artistic faculty and play its leading role**

In order to play teachers' leading role, it is necessary to work hard to create a team excellent in both performing skills and moral integrity. Teachers are the instructors of students' learning. Integrating ideological and political elements into music courses can have a subtle influence on students' thoughts, make them realize the transformation from theory to practice, and achieve the organic unity of professional knowledge and ideological and moral education.

In integrating the ideological and political theories in all courses with the teaching of music, teachers must have an in-depth understand of both so as to better integrate them. Music teachers should pay more attention to interdisciplinary communication, actively participate in teaching seminars, share teaching experiences. What's more, they should constantly summarize and reflect on music teaching models, explore the effective way of music course teaching and ideological and political integration, so as to improve their ability. Teachers should deepen the educational reform in the new era and actively explore the way of combining music curriculum with ideological and political education. Colleges should strengthen the education of music teachers so that they can keep abreast of the current political situation, pay close attention to the current political dynamics, and become the pioneers of the ideological and political education. In this way, they can establish a scientific and systematic ideological and political teaching system.

### **2.4 Actively transform teaching methods and effectively promote the reform of ideological and political theories teaching in all courses**

The rate of study of vocal works from various countries should be increased appropriately to broaden their musical and cultural knowledge. With the popularity of various adaptations, harmonies, and a cappella songs, sight-singing exercises

can add the multi-voice training, and to a certain extent, add the ideological and political elements. For example, polyphonic sight-singing is a high level one that not only improves the students' pitch, but also fosters teamwork. Each individual's voice blends with the group's voice can achieve an extremely high level of harmony and unity. The addition of polyphonic sight-singing can stimulate collective feelings and help form consensus.

Teachers' teaching and students' performance are combined to realize the unity of knowledge and practice. Teachers can teach through their own explanations and students' demonstrations. For example, when learning Chinese vocal works, teachers can choose songs such as "I Love You, China" and "Motherland, Loving Mother", then ask students to demonstrate. Firstly, the teacher can explain the ideological connotation and spiritual culture in music for students, and then carry out in-depth teaching according to the performance of the students. In this way, it can not only arouse students' learning enthusiasm, but also let them experience the beauty of music image, rhythm and artistic conception. At the same time, it can also stimulate students' moral sentiment and aesthetic sentiment, so that the music courses can keep path with ideological and political courses then have a synergistic effect.

The combination of teachers and students' thinking and audio-video observation improves the thinking ability of the course. In teaching, we can use video recordings of teachers and their reflections to guide and direct students' spiritual, value and aesthetic enlightenment. Facing the emergence of a large number of music majors in the Internet era, we should make full use of network education resources. Balance drama, opera, film, art and other forms of artistic expression, and comprehensively integrate ideological and political elements into students' solfège practice. For example, when teaching Red Star Song, teacher can play the original music and explain some related ideological and political knowledge. Teachers should encourage students to ask questions and make comments about the exercises, and praise those who have positive ideas to further increase their curiosity. In addition, students can be taught in a phased manner using the way of "ideological and political". For example, teachers should collect, sort, classify, and explore the political factors behind the solfège works of different periods. Integrate ideological, artistic and infectious fragments of outstanding musical works into teaching through concrete and vivid audio and visual images, and encourage students to discuss and interact with the teacher. In this way, we can better utilize the positive role of ideological and political theories teaching in all courses in the teaching of solfège and ear training.

(This paper is the research result of the general project of Taizhou university. Project name: A study on the "ideological and political theories teaching in all courses" model in music performance class. Project number: 2020CXXL063)

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网络游戏障碍大学生的音乐治疗  
MUSIC THERAPY FOR COLLEGE STUDENTS WITH INTERNET  
GAMING DISORDER

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大学生网络游戏障碍（以下简称IGD）是一种消极行为模式，是当今大学生存在的重要心理问题之一。随着网络和游戏技术的发展，以及用户的增加，大学生投入网络游戏的时间也相应增加。因此，网络游戏引发的相关问题也越来越突出。IGD在我国的患病率为5%~10%，比较高，危害大，治疗棘手。患者会失去对行为的控制，日常生活和兴趣会被游戏剥夺。即便如此，玩游戏的行为仍在继续或升级，在社交场合中显得格格不入。音乐疗法，顾名思义，就是使用音乐进行心理治疗。音乐可以让人放松和愉悦，应用音乐疗法介入治疗这种严重的大学生心理问题是一个新的研究课题，更容易被学生接受。

关键词：IGD；干涉；瘾；音乐疗法；大学生；精神健康。

**Abstract.** *College students' Internet Gaming Disorder(hereinafter referred to as IGD) is a negative behavior pattern and one of the important psychological problems that exist among college students today. With the development of network and game technology, as well as the increase of users, the time college students devote to online games has increased accordingly. Therefore, the related problems caused by online games have become more and more prominent. The prevalence rate of IGD in China is 5%~10%, which is relatively high, and it is harmful and tricky to treat. Sufferers will lose control of their behaviors, and their daily life and interests can be deprived by games. Even so, the behaviors of playing games continue or escalate, and they appear to be out of place in social occasions. Music therapy, as the name suggests, is the use of music for psychotherapy. Music can be relaxing and pleasurable, and apply music therapy to intervene in the treatment*

*of this serious psychological problem in college students is a new research topic, which is easier for students to accept..*

**Keywords:** IGD; intervention; addiction; music therapy; college students; mental health.

With the development of the Internet, Internet Game Disorder (IGD) has become a serious public health problem. It has various negative effects on the individual's body and mind, such as academic burnout, aggression, low self-efficacy, loss of appetite, disturbed sleep rhythm, migraine, and backache. These results suggest that online game addiction deserves more attention from researchers. Music therapy, on the other hand, mainly uses music as a vehicle to heal the human mind, which is more easily accepted by students and produces better results. Therefore, it is of positive significance to apply music therapy to college students' psychological education. For students, it is a simple and pleasant treatment, and for teachers, it is a new research path. In the long run, music therapy is bound to have broad development prospects, and mental health education in colleges will gradually focus on music therapy.

### **Chapter 1 Core features and differential diagnosis of IGD**

Patterns of continuous or repetitive play behaviors are manifested by the inability to control the situations (e.g., inability to control the frequency, performance behaviors, completion time, duration, etc.) and playing online games has become a priority in their lives. Although the negative effects have occurred, they cannot stop it.

The pattern of playing games may be persistent or intermittent, lasting longer than 12 month. If symptoms are severe enough to match other diagnostic points, they may last less than 12 months. If college students are afflicted with IGD, it can lead to serious impairment in personality, family, learning, relationships, or other areas.

#### **1.1 Diagnostic criteria for IGD**

A total of nine symptoms are listed in the current criteria, and five of them must generally be satisfied before subsequent judgment. 1) Focusing on games completely; 2) when the game is stopped, symptoms such as discomfort, anxiety and irritability appear; 3) gradual increase in time spent on games; 4) inability to reduce time spent on games and quit; 5) abandonment of other activities and loss of interest in other previous hobbies; 6) focus on games even though one understands the bad effects on oneself; 7) concealment of ones time spent on games from family members or others; 8) alleviating negative emotions by playing games such as feelings of guilt, despair, etc.; 9) have lost or may lose work and social life due to playing games.

As you can see from the above, games are important criterion for contemporary college students. Most people solely use games to kill time or as a leisure

hobby. They won't let it interfere with normal life, study or work, and won't suffer a long period of negative feelings when stop playing. However, if one cannot control their game time, cannot stop playing games even after they know it has negatively affected their life. What's worse, they became anxious and irritable after stopped playing games, and this happened for a long time. Then it is likely that they are suffering from IGD.

It is also important to distinguish between IGD and normal playing behaviour in the diagnosis. This distinction is very important and is the source of the controversy surrounding the diagnosis of IGD. It should not be diagnosed as IGD if the repeated play behaviour is aimed at promoting social interaction, regulating mood, relieving boredom, etc., does not cause clear impairment of social functioning, and lacks the other features of IGD.

### **Some adverse effects and comorbidity of IGD**

1) Physical problems. The main physical problems caused by IGD are: malnutrition, sleep problems, stomach ulcers, seizures, formation of venous embolism in the lower limbs due to sedentary lifestyle, and even sudden death due to pulmonary embolism; 2) Mental problems. The main mental problems caused by IGD include irritability, anxiety, depression, and guilt; 3) Social impairments. Social impairments due to IGD include refusal to attend school, avoidance of social activities, impaired academic and vocational achievement, and loss of important relationships.

IGD is commonly associated with depression, attention deficit hyperactivity disorder, anxiety, obsessive-compulsive disorder, and hostility or aggression. There is a close bio-psycho-social relationship between attention deficit hyperactivity disorder and IGD. Firstly, the core symptoms of ADHD are "easy boredom" and "aversion to delayed rewards". Since the main feature of online games is rapid response, it may reduce feelings of boredom by providing immediate stimulation and rewards for ADHD patients. Secondly, people with ADHD can use the Internet to deal with their frustrations in the real life. Lack of self-control can make it difficult for patients to control the frequency and more likely to develop addiction. Finally, impulsivity, hyperactivity, and inattention will have a negative impact on an individual's interpersonal relationship, and these defects can be easily covered up on the Internet.

## **Chapter 2 Advances in the study of addiction**

### **2.1 Analysis of the mechanism of addiction**

Addiction is found not only in humans, but also in animals, such as rats drinking alcohol. Addiction is linked to brain structures that reward instinct. Instincts persist because there is a reward system in the brain to reward instincts. If this instinctive behavior is not rewarded, such as eating food that is tasteless or even uncomfortable, or sex that is not sexually pleasurable but merely laborious, then

behavior is inhibited and people die and races become extinct.

Addiction cannot be separated from the inner workings of the brain's mechanisms, and there must be a relevant structural basis to support it. The dumbbell-shaped structure on the inner surface of the rhinoceros is the central point of addiction, and its abdominal covering area is where dopamine production is more concentrated in the brain and then shifted to the nucleus accumbens, which is associated with almost all rewards, including substances and behaviors. If this nucleus is destroyed, it will not want to eat, fall in love and engage in business, everything will be boring.

Different substances have different effects in the brain, but whether they act directly or indirectly, they act on the nucleus accumbens. Heroin acts on both nuclei, while alcohol does not act directly on both nuclei, but through a mediating mechanism. That's why drinking is far less enjoyable than drugs. It has a long and wide range, including physical effects, which is why abstinence is more dangerous than detox.

Heroin withdrawal is the most dangerous drug withdrawal because it has a strong somatic response that can lead to death. But alcohol withdrawal is more dangerous, with a even higher mortality rate. That's why it's generally not recommended for alcohol addicts to quit drinking at home, let alone take the medication home to quit drinking, and they have to go to the hospital for treatment. The risk of death increases if you can't resist drinking while taking alcohol withdrawal medication. Of course, humans have psychosocial activities, so they are more complex and advanced than the average animal. When psychosocial factors are combined with instincts, medical disputes are more likely to occur.

It follows that substance addiction begins with the entry of the substance into the organism. But this is not enough, it must be able to act on the reward system to produce a rewarding effect, to produce a corresponding feeling of comfort, or to eliminate the feeling of discomfort, both of which are indispensable. On the contrary, behavioral addiction does not require the intake of foreign substances, but through the implementation of certain behaviors to achieve psychological or physiological satisfaction. For example, pathological gambling, IGD, shopping mania, workaholics, hair pulling, etc.

## **2.2 Characteristics of addiction**

There are six characteristics of addiction, including: 1) the addict has a strong desire to do a certain behavior, but the result is harmful; 2) If the addict refrained from doing something, he or she would be nervous and anxious; 3) once the behavior is completed, the nervousness and anxiety will be relieved quickly or temporarily; 4) after a period of time, the desire to perform the behavior will reappear; 5) external and internal environmental stimuli can cause the desire reflexively; 6) the addict hopes to control the behavior, but repeatedly fails.

### **2.2.3 Memories of online game addicts**

Addiction is considered to be a learning and memory disorder, such as drug addiction, which is often accompanied by impaired working memory function. Compared to drug addicts, online game addicts show higher P200 and P300 amplitudes, indicating impaired working memory and reduced negative correlated variance (CNV) amplitude. There were no significant differences in N1, N2, P2, and P3 amplitudes and latencies. At present, the influence of online game addiction on episodic memory has not been found, so it is difficult to prove that episodic memory is also an important reason for the formation of online game addiction.

### **Chapter 3 Definition of music therapy**

Music therapy is based on the practical qualities of music. Music therapy is based on the practical qualities of music. The use of music or music-related experiences as a means of treating illness or promoting physical and mental health according to the medical function of the system. As long as there is a way to achieve the purpose of promoting the physical and mental health of the human body, music therapy activities and medical functional applications should fall under the category of music therapy.

Also, there are multiple schools of music therapy, each with different functions and ways of using them. However, in general, music therapy works on 3 main areas: physical, psychological and interpersonal. For example, listening to stimulating and dynamic music can cause the heart rate to rise and emotions to fluctuate, while soothing music can cause the heart rate to drop and also allow the listener to relax their muscles and feel a sense of healing. In addition, music therapy can also stimulate the aesthetic experience of the person being treated. The beauty of music can arouse people's positive attitude, and a large number of studies have shown that people can face life positively after being cured by music therapy.

Music therapy is divided into individual therapy and group therapy. Individual therapy is equal one-to-one communication between the treated and the therapist, which is more suitable for deeper psychological therapy. Group therapy is an interactive therapy mode between multiple patients and therapists, which can promote social and communication skills among people.

However, the difference between active and passive music therapy is that the former refers to a process of expressing oneself through music, such as singing or playing an instrument. The latter refers to listening to music to stimulate the senses and guide the imagination, rather than listening to music aimlessly.

### **Chapter 4 Feasibility of music therapy applied to college students with IGD**

Music therapy is widely used, first originated in the United States, mainly used in children, adolescents, adults, the elderly and comprehensive fields. The research on Chinese music therapy began in 1980, when Mr. Liu Bangrui, a Chinese-Amer-

ican music therapy expert, gave a lecture at the Central Conservatory of Music, which was the first time that music therapy theory was spread in China. From then on, research in this area has been conducted in China.

#### **4.1 Music therapy is easily accepted by college students**

Music is the mutual achievement of melody and lyrics, melody can make people calm down, lyrics can arouse resonance, the combination of the two can catharsis. This shows that music is indeed a healing remedy for the soul. Music can be a direct physical stimulus as well as a medium for self-expression and interpersonal interaction. It can be both physically and emotionally pleasing, while expressing one's emotions and engaging in an invisible interpersonal interaction. For college students, this type of therapy is much more interesting and receptive than traditional psychological interventions. While traditional psychological interventions sometimes present a didactic state that can make students reluctant to take the initiative, music therapy is a relaxed and comfortable approach. For psychologically stressed students, it is not easy to find a comfortable environment. Therefore, music therapy is a viable and effective psychological intervention for college students' mental health education.

#### **4.2 Approaches to music therapy in college students with IGD**

For most college students, music is a relatively important part of their lives. Music provides college students with a free, less threatening environment and opportunities for autonomous, creative expression. Therefore, music therapy has a special effect on the intervention of college students with IGD.

**Group supportive activity music therapy.** Group therapy is a common form of intervention for college students with IGD. If the visitor has a certain degree of social tolerance, the group format can help him or her to improve listening and interpersonal skills. Group therapy for college students with IGD must follow the important principles of safety and respect, i.e., providing a safe environment for visitors and respecting their behaviors and choices in therapeutic activities. The supportive activity music therapy approach focuses on using musical activities as a medium to help college students experience emotional support from others or their surroundings, or even their own selves during the activity. For example, to guide them to learn positive music skills that fit the culture and interests of college students. Playing in a group ensemble in group activities can help them boost self-esteem, develop positive relationships, and deflect feelings of tension and anxiety. It can also carries out music appreciation, comparing teenagers' favorite music styles with other music styles, encouraging them to share their favorite singers or music styles with each other, and cultivating their tolerance for others' preferences.

**Song writing.** Visitors are encouraged to adapt and recreate the songs, and the therapist can analyze their underlying concerns or other personal psychological

issues through the lyrics they provide.

**Improvisation.** The focus of this intervention is not so much on the musical composition created, but rather on the relative freedom of self-expression and emotional release that the visitor has during the creation process. Because the works created under such conditions often reflect the overall emotional characteristics of college students.

**Lyrics analysis and discussion.** The therapist should try to use music that the college students are interested in or familiar with and discuss it in depth. For example, select the parts of the lyrics that are most meaningful to them or their least favorite parts, using music as a non-threatening intervention to help them engage in appropriate emotional catharsis and expression.

In conclusion,, the study on college students' IGD is of great scientific significance and social value. For the prevention and control of IGD, China should establish a cross-sectoral coordination mechanism of health, education, and culture to regulate and monitor the online game industry, Internet platforms, and gaming disorder treatment facilities to ensure the healthy operation of online games and provide help for patients and their families. However, for college students suffering from IGD, they should listen to more music and make sure their time well-scheduled. People with severe gaming disorders can also seek help from professional therapists to take music therapy to heal them, regulate emotions and reinvent themselves.

(This paper is the research result of the general project of Jiangsu Provincial innovation in 2019—"A Study on the Home Training Mode of College Students' Music Practice Course during the Pandemic", Project number: 201912917017Y)

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现代高中转型条件下教学活动的道德层面  
**MORAL ASPECTS OF PEDAGOGICAL ACTIVITY IN CONDITIONS  
OF TRANSFORMATION OF MODERN HIGHER SCHOOL**

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**Abstract.** *The global problems of the modern world affect not only the political, socio-economic but also the spiritual life of society. An important place in this process belongs to the system of higher education, and in it - to the professional teacher. There is no doubt that the moral health of the nation today and the prospects for its development in the future largely depend on the ethical component of his activity, the ability to overcome any difficulties and conflicts in relationships with students, colleagues and the surrounding social space.*

**Keywords:** *Higher education, teaching, ethics, moral culture, moral ideals, moral values, moral principles and norms.*

As you know, the teacher, by his activity, is called upon to educate young people, to form their inner world on the ideals of humanism, goodness, justice, honor, dignity, fidelity, altruism, thanks to which interpersonal, group and social relations will acquire the status of moral and will resist confrontation, alienation, creating, a solid foundation of empathy, peacefulness, cohesion in the relationships of all members of society, regardless of age, nationality or ethnicity.

At present, the field of ethics as «Practical philosophy» is in the focus of attention in many countries of the world. Currently, there are international programs «Ethics in the World», «Ethics of Science and Technology», «Ethical Education», «International Commission on the Ethics of Scientific Knowledge and Technology (COMEST)» which are the basis of programs in the social and human sciences at UNESCO, including the «Association of European Universities» (European Universities' Association - EUA).

Evidently in the system of Russian higher education, regardless of its specific

professional orientation, applied and professional ethics should become one of the leading humanitarian disciplines. However, despite the growing importance of ethics as a field of science and academic discipline in the university, the current potential of pedagogical ethics in leading national universities remains largely unrealized. This concerns various aspects of the problem, primarily:

- the role, place and importance of the teacher in the integration system - culture, morality and education (including higher education), as an important part of the spiritual and social space of modern society;

- moral relationships between a teacher and a student (in the aspect of interpersonal, group and collective relations) within the framework of the educational process as a future model of socialization;

- formation of the foundations of corporate culture within the framework of higher education as a whole, as a factor in the establishment of the norms of the spiritual, moral and social culture of a modern open democratic society;

- creation of new types, methods, forms and technologies of pedagogical ethics in the context of the rapid transformation of modern higher education.

Pedagogical ethics is the most important component of the moral culture of society and, at the same time, a tool for its regulation, among which the most important must be named: moral ideals, moral norms, moral principles, public views, authority, traditions, commandments, habits, rules. Let's consider some of them.

The idea of moral values and ideals as a form of duty and responsibility of a person has formed in modern pedagogy an ever-increasing interest in various changes in the internal determination of students, reflecting their views on their own destiny and the destiny of the world as a whole. The problem of determination and self-determination of human destiny recognizes the objective regularity and causality of all phenomena of nature and society. It is this aspect that is the most promising in the development of the problem of psychology and pedagogical ethics.

External and internal determination reached catastrophically low limits precisely at the turn of the XX-XXI centuries. This is especially acute among young people, who are most susceptible to various phenomena of anti culture. Therefore, the role of the teacher is extremely important here. The teacher is called upon to do everything possible to reduce the susceptibility of students to pseudo - culture and immorality. It is important to form in them a high level of self-determination of the ability to critically evaluate various phenomena. The higher the level of self-determination of human culture, the more moral it is.

The main element in the implementation of the regulatory function of morality is its norm. It expresses the moral demands of society, the state and the collective. Moral norms determine the basic moral duties of a teacher in relation to pupils. They cover the sphere of moral necessity and, like other social norms, are imperative. However, sometimes moral prohibitions are not realized by the teacher,

they do not become his inner conviction. At the same time, he has weak «moral brakes».

Norms-frames define the boundaries of the permissible free action of the teacher. First of all, they contain the exciting power of active activity. If the prohibition norms perform a coercive function, then the framework norms, as a rule, perform the function of an obligation. The framework norms are mainly contained in moral precepts, codes, charters of educational institutions, and the like. They arise as a manifestation of the social need for people's behavior in various spheres of public and private life. The development and change of social relations will certainly lead to changes in the moral experience of people. The development and change of social relations will certainly lead to changes in the moral experience of people. It lends itself to critical rethinking, which predetermines the replacement of old norms-frameworks with new ones, and not always more humane and progressive ones. This is especially noticeable at the present time, when education and culture are commercialized, and even the pedagogical activity of a teacher acquires pragmatism. Norms-models do not perform the compulsory function of social thought and self-consciousness of the individual. They act as a kind of model of future behavior, acting in the form of ideals, and then a practical norm of behavior.

The moral norm is not the only element in the implementation of the regulatory function. In unity with it, moral principles, public opinion, authority, traditions, customs, etc. act. All of them together constitute a kind of programming, motivating and sanctioning “construction” in the mechanism of moral regulation. Moral requirements, which are contained in real norms, principles, traditions, exceed the average level of moral practice. « My education system» A. Makarenko wrote, «moral requirements for a person should be higher than the average degree of a human act. Morality generally requires that behavior be equal to the most perfect» [4].

The teacher should also keep in mind that the formation of a worldview, moral habits, feelings, behavioral motives also occurs on the basis of cultural and regional traditions. Therefore, while educating the future generation, the teacher should take into account the moral consciousness of the population of the region, its customs, values, way of life, and the like. The clearest example is the ongoing processes of transformation of all spheres of culture of Crimea as a region of the multinational Russian Federation, which is reflected in its Constitution.

The ethics of the professional activity of a higher school teacher is inconceivable without the realization and affirmation of the freedom of the creative process, because the result of it is the creation of the student's personality. In this understanding, the spiritual creativity of the teacher acts as meta-creativity, because it is thanks to her freedom that a real shift and achievement of the goal takes place. N. Berdyaeva wrote about this, according to which: «Only the free one creates. Out of necessity, only evolution is born; creativity is born from freedom»[6, 549]. At pres-

ent, the freedom of creativity of teachers of higher educational institutions is being tried in every possible way to bureaucratize. Therefore, even talented scientists and teachers are not able to apply the latest pedagogical technologies due to various decrees and resolutions. Instead of creativity, there is tradition, stereotype, pattern in teaching and education.

The most important side of pedagogical ethics are the principles of constructive speech communication, the interaction of a teacher with students, colleagues and parents, which takes place in a real speech situation in classroom conditions outside of extracurricular interactions. Communication in these areas involves the observance by the teacher of certain norms and rules of behavior, including speech. In this regard, we will define some of the communicative (discursive) skills of a teacher that are necessary in professional pedagogical activity:

- the ability to show empathy - penetration into the experiences of another person, the ability to put oneself in his place; the ability to empathize, sympathize, sympathize with the experiences of other people;
- ability to resist verbal aggression, verbal manipulation, vulgarization and jargon of speech.

**Conclusion.** The issues raised about the ethics of the professional activity of a teacher in modern higher education give the right to speak about the relevance of its study at the present stage of reorganization of the national higher school, the need to develop its historically established traditions in the conditions of the modern period of time. However, continuity and integrativity needs further theoretical substantiation and practical implementation. First of all, this is due to the fact that moral ideals, values, moral norms have their own strictly fixed position, to a greater extent, they act as a “cut” and proof of existing contradictions, including the areas of culture and education, where these contradictions reveal themselves most sharp and distinct. It was these facts that A. Schweitzer drew attention to in his famous work «Culture and Ethics»: «A person becomes truly moral only when he obeys the inner impulse to help any life that he can help, and refrains from doing any harm to the living» [5, 307]. Morality helps to penetrate into the inner content of the formation and functioning of the culture of the individual.

All this complicates the work of a teacher in the direction of educating and shaping the moral qualities of his pupils (at what age they would not be), complicates the process of discovering the world of human culture. The ethics of the professional activity of a teacher should be aimed at solidifying in the minds of their students the foundations of moral values as a system of moral knowledge and beliefs, feelings and skills, norms and relationships, interests and needs, cultural and moral experience and direct behavior that ensure self-improvement, training and education of the individual that ensures the spiritual progress of a particular people, state and world community.

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高等教育机构学生发展教学工具的教学条件，以发展钢琴初学者的阅读技能（俄罗斯联邦和中国的比较教育学方面）

**PEDAGOGICAL CONDITIONS FOR THE DEVELOPMENT BY STUDENTS OF HIGHER EDUCATIONAL INSTITUTIONS OF TEACHING AIDS FOR THE DEVELOPMENT OF BEGINNER PIANISTS READING SKILLS FROM A SHEET (IN THE ASPECT OF COMPARATIVE PEDAGOGY OF THE RUSSIAN FEDERATION AND CHINA)**

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**Annotation.** *The article is devoted to the consideration of the experience of Russian universities, and in particular, the Faculty of Musical Art of the Moscow State Pedagogical University in the development by Russian students of teaching aids for the development of beginner pianists' sight reading skills (in the aspect of comparative pedagogy of the Russian Federation and China). The authors focus on the approaches to the formation of this competence, presented in the works of Chinese music teachers - Liang Haidong, Sun Lulu, Hu Ying. Among these are positioned the installation of the need for coordination in the performing process of the actions of the eyes, hands, hearing of a novice pianist; formation of students' attention concentration, as well as internal hearing, as a complex of mental processes: perception - memory - imagination.*

**Keywords:** *comparative pedagogy of music education, sight reading, spectral perception of the keyboard, auditory and visual abilities of the pianist, integration of the actions of the eyes, hands, hearing.*

At present, in the context of the globalization of the world, including education, it seems insufficient to master pedagogical experience exclusively in the local dimension, based on the material of the country of residence of students. Proceeding from this regularity, the ideas of comparative pedagogy are being ac-

tualized in musical and pedagogical education today. This trend concerns research at the philosophical level, general scientific and particular scientific, for example, in the field of teaching methods to play the piano.

Thus, by means of empirical methods, we found that Russian students are well acquainted with the methods of teaching sight reading on the piano T. Kamaeva, A. Kamaev "Reading music from a sheet"; F. Bryanskaya, L. Efimova, S. Lyakhovitskaya "Manual for reading sheet music"; I. Ryabova, S. Ryabova "Sight Reading at Piano Lessons", etc. Meanwhile, it was clearly difficult for future musical teachers to identify the general and the special in the methods of Russian authors and their colleagues from China.

To this end, we have developed a number of classes, the tasks of which were considered:

- *teaching*: the formation of knowledge of Russian students about the educational and methodological equipment for the process of forming skills in reading from a sheet on the piano at the initial stage of mastering the instrument in the PRC (methods of Liang Haidong; Sun Lulu; Hu Ying);

- *educational*: fostering students' interest in comparative pedagogy in the field of music education in the Russian Federation and China;

- *developing*: development of analytical competencies to identify common and special in approaches to teaching Russian and Chinese teacher-musicians to read from a sight.

Classes were carried out with bachelors in the conditions of the scientific discipline "International cooperation in the field of musical culture and education." Chinese students of the master's program of the educational program "Musical Art and Education" took part in conducting classes within the framework of pedagogical practice.

In the classroom, undergraduates made prepared reports. The role of the speaker was likened to the role of a moderator (from Latin "keep within, restrain"). The main principles of the moderator's activity were considered:

- *the principle of equality*. Those. we suggest that the moderator not give a lecture, but talk with the participants of the seminar. At the same time, the right of everyone to their own professional position was recognized;

- *active creativity*. Approving this principle, we proceeded from the principles of modern psychology, which states that an adult learns 20% of what he hears, 40% of what he hears and sees, 60% of what he hears, sees and discusses, and 80% of what he tries to think of. and do it yourself;

- *personal orientation*. We positioned this principle as the desire of the moderator to understand the participants;

- *comfort*. Providing for the creation of inner comfort and positive emotions during the mastery of the methods of teaching sight reading by bachelors in the aspect of comparative pedagogy of Russia and China.

For presentations, articles by Chinese teachers on the problems of teaching sight reading at the initial stage of mastering the piano were proposed [1]; [2]; [3].

The instructions for the presentation at the seminar were the following instructions:

- give examples from musical and pedagogical practice;
- to structure the text of the speech as a series of theses on the problem under consideration, which excluded the problems of the language barrier;
- visualize information blocks with instrumental display and presentation slides;
- provide for interactive participation of the audience in the workshop on the development by Russian students of publications on teaching sight reading at the initial stage of mastering the piano used in the educational process of the PRC.

One of the messages was a review of an article on the problem of spectral perception of the keyboard in learning to play the piano. The seminar participant noted the importance of visual training of a pianist student, which, according to the Chinese teacher Liang Haidong, requires purposeful, step-by-step, planned and strict preparation.

Further, in the message of the seminar participant, the problem of “difficulties in reading notes, rhythmic patterns, fingering, and the form of a piece of music” was identified. In the context of this problem, the audience was asked to consider the ratio of imagination, auditory, visual abilities and consciousness. The conclusion reached by some of the audience is that people with strong visual abilities see music in their minds. Another part of the students expressed a hypothesis about the existence of the fact of visual performance through a subconscious mechanical movement of a motor-motor nature. To solve the problematic situation, it was proposed to get acquainted with the pieces of the collections for sight reading published in China, and in particular, Sight Reading Rhythm Every Day. Students were asked to analyze some spreads of the collection. The students were convinced that the preparatory exercises for mastering rhythmic patterns contribute to the conscious transfer of the acquired skills to the performance of the musical text, as well as the formation of the “feeling of the keyboard”.

Also at the lesson, the position of the Chinese teacher Hu Ying was considered. In the student's report, it was noted that "reading from a sheet" is an ability that a pianist should have, and first of all, the "visual ability" of a performer. In this regard, further special attention was paid to the methodology for developing the visual ability of students as a necessary condition for success in teaching sight reading on the piano.

At the same lesson, students were asked to make a comparative analysis of the methodological approaches to teaching sight reading by Liang Haidong and Hu Ying. Common features were called a preliminary mental analysis of the rhythmic

pattern of a work performed from a sheet; the need for systematic work; gradual increase in the level of complexity of tasks; formation of sight reading skills in the ensemble.

Another presentation by the students was a presentation according to the Sun Lulu method. In the methodological approaches of this author, the need was noted for the formation of the transformation of the perceived visually musical text into its projection on the keyboard.

The logical conclusions were the statements, according to which the methodology of Chinese music teachers substantiates the fact that:

- in reading from a sheet on the piano, a complex of analyzers is involved, which requires coordination in the educational process of the actions of the eyes, hands, hearing;

- beginner pianists should form the performer's concentration of attention, as well as inner ear, as a complex of mental processes: perception - memory - imagination.

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中国学生掌握 19 世纪俄罗斯声乐学校过程的历史和教学方面  
**HISTORICAL AND PEDAGOGICAL ASPECT OF THE PROCESS  
OF MASTERING THE RUSSIAN VOCAL SCHOOL OF THE XIX  
CENTURY BY STUDENTS OF THE PRC**

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本文致力于组织俄罗斯大学中国学生掌握十九世纪俄罗斯声乐学校的历史和教学活动的过程。作者确定了形成教师-歌手的历史和教学能力的方法：文化学、范式教学法、语调、个性活动、以实践为中心。作者着重描述了应用项目技术作为激发中国学生认知活动的手段，同时组织学生独立工作以掌握十九世纪俄罗斯声乐学校的方法。

关键词：历史和教学活动，中国学生，俄罗斯声乐学校，项目活动技术，形成和发展的先决条件。

**Abstract.** *The article is devoted to the process of organizing the historical and pedagogical activities of Chinese students of Russian universities in mastering the Russian vocal school of the XIX century. The author identifies approaches to the formation of the historical and pedagogical competence of a teacher-vocalist: culturological, paradigm-pedagogical, intonation, personality-activity, practice-centric. The author focuses on the description of the methodology for applying the project technology as a means of motivating the cognitive activity of the PRC students, and at the same time organizing independent work of students in mastering the Russian vocal school of the XIX century.*

**Keywords:** *historical and pedagogical activity, Chinese students, Russian vocal school, technology of project activity, prerequisites for formation and development.*

The professional training of Chinese students involves mastering a number of academic disciplines, one of which is the history of music education. Within the framework of this subject, students develop historical and pedagogical competence. This allows students of the PRC to master the essence of the phenomenon of Russian performing schools.

So, in particular, the work programs of the disciplines of professional training

of a vocalist-teacher provide for the study by students of the Russian vocal school, as an independent creative direction in the musical art and musical pedagogy of Russia, due to prerequisites of a culturological nature: the relationship with the layers of Russian folk and sacred music, as well as the fact of the formation and development of the composer school. This process is associated with a whole range of approaches.

*The cultural approach* identified by L.A. Rapatskaya [1], allows Chinese students to comprehend the Russian vocal school as a number of specific periods, structural units of cultural and historical eras, including the XIX century.

Along with the culturological approach in mastering the history of music education by Chinese students, significant attention is paid to the *paradigm-pedagogical* approach, the essence of which is described in the concept of E.V. Nikolaeva [2]. This similarly models the study of the works of famous Russian vocal teachers M.I. Glinka "Exercises for leveling and improving the flexibility of the voice", "School of Singing for soprano", A.E. Varlamov "School of full singing"; G. Nissen-Saloman "School of Singing", A. Dodonova "Guidelines for the correct setting of the voice", I. Pryanishnikova "Advice for those who study singing"; G. Lomakina "A Brief Method of Teaching Singing", A. Rozhnova "Guidelines for Teaching Singing", O. Volshevsky "A public guide to the study of singing" in the context of a longitudinal study of the gradual formation and development of the phenomenon of the Russian vocal school.

In conjunction with the cultural and paradigm-pedagogical approach, the *intentional approach* acquires no less importance in organizing the process of mastering the Russian vocal school of the XIX century by foreign students, which allows students to comprehend the basic settings of the masters of Russian vocal art on the example of the creativity of the brightest performers of this historical period A.V. Nezhdanova, L.V. Sobinova, F.I. Chaliapin, *personality-activity* and *practice-centric* [3].

The last of these approaches to the development of the Russian vocal school of the XIX century by Chinese students are associated with the technology of the project. In this, we rely on the concept of J. Dewey [4], according to which the achievement of a didactic goal through a detailed development of the problem should be completed with a real, tangible practical result. As such, we position the creation of presentations by Chinese students, the form of which can be varied, as well as the *dominant activity in the project* (research, search, creative, role-playing, applied). As an exemplary topic of projects, one can name "A.E. Varlamov", "Vocal-performing activity of A.V. Nezhdanova). *The subject-content area of the project* similarly assumes the student's right to choose the type: mono-project (within the same field of knowledge, for example, "C. Everardi's Method", "U. Mazetti's Method"); interdisciplinary project ("Vocal-performing principles of F.I. Chaliapin in the interpretation of vocal compositions by M.P. Mussorgsky").

Let us consider the mechanism for the implementation of project activities in the course of the development by Chinese students of the topic "A.E. Varlamov".

The objectives of the project are:

- *educational*: revealing the characteristic features of A.E. Varlamov;
- *educational*: fostering interest in historical and pedagogical research;
- *developing*: development of mental operations of comparison, analysis and generalization among students.

As a result of the project, Chinese students master the main provisions of the theory:

1) adequacy of "School of singing" by A.E. Varlamov:

- the national identity of Russian music combined with the foundations of classicist and early romantic aesthetics;
- the structure of foreign vocal techniques of the late XVIII - early XIX centuries. (the first part is theoretical, where singing is defined, the history of singing art, teaching methods and the duties of teachers are considered. The second part of the "School" is practical, includes exercises designed to develop specific vocalization skills. The third part is recommended material);

2) substantive aspects of the "School of Singing" by A.E. Varlamov: singing and voice formation as a process in the context of the history of singing art; basics of vocal technique; voice types; breath; performing tasks, duties of vocal teachers;

3) principles of the "School of Singing" by A.E. Varlamov:

- modal, with the aim of educating the singer to feel the connections between the steps of the mode, as well as between the sounds of the scale;
- the relationship between the stages of singing training (solfegeing - vocalization on vowels - singing with words);
- a sequence of exercises for the development of voice according to the degree of difficulty;

4) methods and methodological techniques of the "School of Singing" by A.E. Varlamov:

- milling at an early stage of training;
- fragmentation of a singing sound on one sustained note.

The theoretical material during the development of the project is associated with a creative component - the performance of vocal works by A.E. Varlamov: romances "A lonely sail turns white" (lyrics by M.Yu. Lermontov), "Do not wake her at dawn" (lyrics by A.A. Fet), "Little star" (lyrics by V.S. Mezhevich).

A prerequisite for creating a project is the inclusion of visual material in the presentation, including the musical text of "School of Singing" by A.E. Varlamov, which allows you to combine the forms of organization of the educational process - a lecture and a workshop, as well as to motivate the cognitive activity of

Chinese students in mastering the Russian vocal school of the XIX century.

Another example is the project "Prerequisites for the Formation of the Russian Vocal School in the 2nd Half of the XIX Century".

Tasks:

- *educational*: to acquaint students with the prerequisites for the development of the Russian vocal school in the 2nd half of the XIX century;
- *educational*: fostering interest in historical and pedagogical activities;
- *developing*: the development of musical thinking, mental operations of comparison, analysis and generalization in the comparative aspect of the study by Chinese students of the vocal creativity of Russian composers of the 2nd half of the XIX century.

Musical material of the project:

- fragments of video recordings of productions of the operas "Boris Godunov", "Khovanshchina" by M.P. Mussorgsky; "Prince Igor" A.P. Borodin; "Sadko" N.A. Rimsky-Korsakov;
- audio recordings and notes of romances by P.I. Tchaikovsky "Do not believe, my friend", "A tear trembles", "Not a word, my friend", "Both it hurts and it's sweet", "Why?", "No, only the one who knew".

Electronic resources:

- video recordings of A.V. Nezhdanova ([www/ ololo.fm/artist/videos/A. Нежданова](http://www.ololo.fm/artist/videos/A.Нежданова)); L.V. Sobinov ([www/ ololo.fm/artist/videos/ Л. Собинов](http://www.ololo.fm/artist/videos/Л.Собинов)); F.I. Chaliapin ([www/ ololo.fm/artist/videos/Фёдор Иванович Шаляпин](http://www.ololo.fm/artist/videos/ФёдорИвановичШаляпин)).

The planned results of the participation of Chinese students in this project are their awareness of a number of facts, prerequisites that determined the development of the Russian vocal school in the second half of the XIX century, which is associated with:

- the heyday of the Russian national school of composers, represented by the work of M.P. Mussorgsky, A.P. Borodina, N.A. Rimsky-Korsakov, P.I. Tchaikovsky and many other Russian composers;
- development of professional musical culture in Russia, the opening of the St. Petersburg and Moscow conservatories, the activities of the imperial Mariinsky and Bolshoi theaters, the Moscow private opera of S.I. Mamontov (later S.I. Zimin);
- the democratization of culture, the emergence of the Free Music School; popularization of national music, which was facilitated by the activities of the Russian Musical Society, founded in 1859 on the initiative of A.G. Rubinstein "for the development of musical education, a taste for music and the encouragement of domestic talents".

Turning to musical material will contribute to the practice-oriented orientation of classes, and audio and video recordings, in turn, will confirm the statements of

contemporaries of the most famous performers of the considered historical stage of the musical culture of Russia A.V. Nezhdanova, L.V. Sobinova, F.I. Shalyapin about the amazing power of the impact of their voices on the listener, will make it possible to see the subtle mastery of the singers in musical speech and the art of conveying the content of a musical text, the art of merging music and words, which is one of the characteristic features of the Russian vocal school.

Thus, it can be argued that the technology of project activity is both a means of motivating cognitive activity in the development of the Russian vocal school of the XIX century by Chinese students and a mechanism for organizing students' independent work. However, this is possible with the systematic methodological guidance of project activities by the teacher in determining the goal, developing an algorithm of actions to achieve the goal, concentrating on solving specific didactic tasks of projects; advising in the selection of musical material and printing publications on vocal pedagogy, taking into account the difficulties of foreign students in mastering the Russian language.

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外语教学方法体系的演变  
**EVOLUTION OF METHODOLOGICAL SYSTEMS OF TEACHING  
FOREIGN LANGUAGES**

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文章专门介绍国外和国内的外语教学方法。它考察了他们从古代到二十世纪末外语教学方法体系的历史演变。描述了每个方法体系的主要目标、目的、技术和教具、理论基础及其在教育过程中的应用范围。对外语教学的主要方法体系进行了分析，并从其在外语教学中的有效性和效率方面确定了它们的方法学价值。

关键词：外语，教学，直接和自然的方法，修改，现代“帕尔默方法”

***Abstract.** The article is devoted to foreign and domestic methods of teaching foreign languages. It examines their historical evolution of methodological systems of teaching foreign languages from the ancient period to the end of the XX century. The main goals, objectives, techniques and teaching aids for each methodological system, the theoretical foundations and the scope of their application in the educational process are described. The analysis of the main methodological systems of teaching foreign languages is carried out and their methodological value is determined in terms of their effectiveness and efficiency in teaching foreign languages.*

***Keywords:** foreign languages, teaching, direct and natural methods, modifications, modern "Palmer method".*

Teaching foreign languages has its roots in the era of antiquity, during the flourishing period of cultural and trade relations between Syria, Ancient Egypt, Greece and Rome. Particular attention was paid to their study in the medieval era, as evidenced by the preserved monuments of literature, a lot of borrowed and recorded in dictionaries vocabulary. At that time, Greek was considered a foreign

language, and after some time, Latin, which remained for fifteen centuries as the official language of many European countries. His study took place at that time, as a rule, in private or in special schools. And only in the XVI-XVII centuries, during the period of the birth and development of capitalist relations and the formation of nation-states, does it become possible for the formation of young national languages in Western Europe, the Latin language begins to fade into the background, continuing to remain the language of the state for quite a long time, in the system of education and science. In the process of the formation of Western European languages, numerous efforts of scientists and teachers are noted in the search for the most rational methods of teaching them. A scientific analysis of the history of teaching foreign languages indicates the presence of many methods, the appearance of which was due to the needs of society. For example, the need for their practical mastery became the reason for the development of direct methods, and the requirement to master them in a short time led to the creation and development of intensive methods, and so on.

Before proceeding to the consideration of the main methods and their distinctive features, it is necessary to deal with the very concept of "method". This term (from the Greek *methodos* - the path of research) from the point of view of linguistic science means "generalized sets of theoretical attitudes, techniques, methods of language research associated with a particular linguistic theory and general methodology; separate techniques, methods, operations based on certain theoretical principles, as a technical means, a tool for the study of one or another aspect of the language" [7, p. 298]. That is, a method or tool designed to solve certain pedagogical problems. With the development of foreign and domestic teaching methods, their certain evolution is also noted, however, this term does not receive an unambiguous definition in the scientific literature. It is also noteworthy that in the domestic methodology, this term denotes not only the integral structure of education, but also its individual components, which in foreign methodology is often considered in the form of "techniques". It is impossible not to note the main criteria underlying the distribution of methods: the presence or absence of the native language in teaching a foreign language, which is typical for direct, translation, mixed methods; correlation of foreign language speech practice and language theory. This applies to practical, consciously practical and consciously comparative methods; the use or non-use of special mental states of students who master a foreign language - alternative (intensive) and traditional methods. Based on the above criteria, it becomes possible to distinguish the following methods: *translation* (*grammar-translation* and *lexical-translation*), direct and *natural* methods and their modifications, mixed, *consciously-comparative* and *consciously-practical* methods and the *modern "Palmer method"* [1].

At the beginning of the XIX century, the problem of mastering oral speech began to be intensively discussed in schools and higher educational institutions

in European countries. To fulfill the social order, *translation* methods are used, in which grammatical and lexical-translational methods were more popular. The grammar-translation or synthetic method was widely popular with the Methodists Margot (France), Nurok, Ollendorf (England), Meidinger (Germany). Its distinctive feature was the unsystematic study of grammatical material. Students mastered certain grammatical aspects randomly, only encountering them directly when working with the text. The purpose of this method was to teach speaking and convey the main idea when translating from a foreign language into a native one. Vocabulary was replenished at the expense of memorized works and vocabulary. Grammar teaching did not have a clear structure. Preference was given to literal translation. There was no introductory phonetic course. The 30s of the XIX century did not deviate much from the teaching methods used in Antiquity and the Middle Ages [5]. The lesson using the *grammar-translation* method was divided into three main stages. The first step was to memorize the text. The students were offered a short text, which they had to read several times, and then repeat it in chorus after the teacher. The translation is usually attached. The second stage involved the analysis of the learned text. Students had to identify syntactic structures in the text and identify the members of the sentence. Thus, a detailed analysis of the learned text was carried out. The third stage consisted of a symbiosis of new material and already learned. The students were given a task, the essence of which was the ability to correlate the material received in the lesson with the material learned in previous classes. At the same time, the teacher used exercises for imitation, retelling of the text, various written assignments, etc.

An analysis of the advantages of the synthetic method indicates that a big plus for the general understanding of the material was the possibility for students to use their native language. However, this method also had a significant drawback - the use of literal translation in the study of a foreign language, which entailed a distortion of the correct correspondences in languages and a change in standard norms in the native language.

Another method used in European countries (France, England, Switzerland) was the *lexical-translational* or *analytical* method, which got its name due to the allocation of vocabulary as the main element in teaching a foreign language. At the same time, grammar still occupied a secondary role in it. The formation of the lexical and grammatical aspects of the language was carried out in the same way as in the grammar-translation method. Supporters of the analytical method, Zh.Zh. Jakoto (France), J. Hamilton (England), A. Chauvanne (Switzerland), put the method of mastering and developing reading and speaking skills at the forefront. This method reflected the general educational goal. The lesson was divided into three stages: mnemonic, analytical, synthetic. The first stage involved the rote memorization of a particular text or one of its passages. Analytical - analysis of

the learned passage. At the synthetic stage, the student superimposed new material on the learned material. Our observations allow us to conclude that the synthetic method of teaching foreign languages was more relevant than the analytical method, since it allowed the student to use his creative potential.

The significant changes that followed in the second half of the XIX century in the field of economics in a number of Western European countries were the reason for revising some of the requirements for foreign languages, searching for and creating the most universal and effective methods for studying them. The result of the efforts made was natural. Representatives of the method M. Berlitz, F. Guen, M. Walter noted that the perception of the material should be carried out by the student by correlating a foreign word directly with an image, action or sensation [9]. At the same time, the grammatical aspect is assimilated intuitively, without relying on the native language, and the comprehension of the educational material takes place in an oral format, in the process of imitation without using the native language. The introduction of new material is done by ear and imitated after the teacher. A lesson using this method involves the following aspects: explanation of the material, discussion, description, reading, reflection. The explanation of the material occurs with the help of various forms of visibility (poster, map, picture, diagram, and others). Discussion implies a communicative connection between the teacher and the class, the elimination of questions that have arisen in the process of mastering a new topic. Description allows the student to take the initiative, for example, to describe the presented form of visibility without the help of a teacher. The performance of tasks is the control of the learned material, for this the teacher uses, for example, reading a text from a textbook. The final stage is the analysis of questions and understanding of the topic by students. Thus, the natural method has made a significant contribution to the development of teaching methods, its elements are also used by modern methodologists and teachers. Its advantage is an unobtrusive way for students to comprehend vocabulary. For example, a teacher uses an item that helps students visualize the meaning of a word through an image. The selection of synonyms or antonyms is not only a good way to comprehend vocabulary in learning, but also a deposit for the development of critical thinking.

Currently, many teachers, using various ways of explaining vocabulary, rely on this method. Based on this method, a *direct* method was also created. The prerequisite for this was the minimal use of the native language in teaching a foreign language. The words of the language being studied were often associated with its meaning. Representatives of the direct method P. Passy, G. Suit, O. Jespersen, S. Schweitzer, G. Wendt were supporters of the practical teaching of students in foreign languages. The direct method has the following principles: oral speech is the basis of learning; exclusion of native language and translation; development of sound speech; the study of the syntactic positioning of the word; an inductive way

of studying grammar [9]. There is no unity in the use of this method. However, most researchers have the following points of convergence: complete limitation of the native language, reliance on memory and perception, study of lexical composition in context, special attention to the sound side of speech.

In the 20s, the direct method underwent significant changes. As a result of numerous experiments, a new method appears, which received its name in honor of its creator, the "*Palmer method*". He had to fulfill the social order of the society of that time, namely, to consolidate all types of speech activity of students with the further goal of getting an education in the USA or England. Its founder highlights the main principles for selecting texts, which should correspond to the interests and age of students and reflect known realities. The learning process itself consisted of three successive stages: elementary, intermediate, advanced. The system of exercises had to be closely related to these stages. The elementary stage forms students' understanding of speech by ear. The intermediate stage prepares them to understand 75% of the text. The emphasis is on fast speaking and writing. The advanced stage is aimed at polishing the acquired knowledge, consolidating skills and deepening all types of speech activity. G. Palmer paid special attention to the expressive stage, since it was the most important in teaching a foreign language. Listening comprehension is gradual. First, students are asked to listen to the speech based on the text. This technique is used to understand spoken language and maintain motivation. Then the students develop the skills of constructing oral speech and partial reproduction of the text. The final step is the free reproduction of the received material [9]. In the future, the "Palmer method" underwent additional improvements and received general recognition from methodologists, and its components are still used in teaching modern foreign languages.

In the domestic methodology of teaching foreign languages of the pre-war period, two main approaches to teaching were distinguished, namely, the consciously comparative and modified direct method, which was very popular in the first half of the XX century. The conscious-comparative method assumed the use of the native language as a basis and became the so-called "musculoskeletal system" of the student. In this case, the native language was the basis both for comprehending a foreign culture and for developing skills and readiness to understand the mentality of native speakers of the target language [2]. This method was finally formed in the 70s of the last century and assumed abstraction from fixed rules, since the formation of speech skills was a necessary element in training [6].

A great contribution to the formation of this approach was made by L.V. Shcherba, who paid special attention in his works to such aspects as language and speech, the specifics of pronunciation styles, vocabulary and grammar, interpretation of words, etc. [11], which were continued in the works of I.V. Rakhmanov, V.D. Arakina, I.M. Berman, A.V. Monighetti, S.K. Folomkina, A.A. Mirolyubov

et al. When considering this method, it would be relevant to single out its criteria, one of which is conscious learning, which implies the native language as a base. Comparison of the phenomena of native and foreign languages allows the student to consciously analyze language structures and perceive a foreign language in comparison. At the same time, translation is the main method of semantization of vocabulary and the study of grammar. As a second criterion, one should single out the connection between transferable and non-translating teaching methods, analytical and synthetic forms of work. Compliance with the sequence in mastering knowledge and skills is the third criterion. This implies a clear presentation of the material, and then the transition to its systematization. It is also necessary to single out such an aspect as the unity of form and content, that is, theory and practice in teaching a foreign language. The main methodological principles of this method include: communicative principle; the principle of orientation to the native language; the principle of interconnected learning; differentiated approach; student experience.

The communicative principle sees its task not only in teaching a foreign language, but also in developing the necessary speech skills in students. Orientation to the native language takes into account the specifics of the native language and its transfer to the target language. Types of speech activity involve the use of written and oral speech. The combination of all types allows us to talk about reading, writing, speaking and listening not only as a means of learning, but also about the fact that the means in this case are the goal of learning a foreign language.

A differentiated approach divides all types of speech activity into receptive and productive in order to further develop communication skills. The experience of learners implies the absence or presence of negative language experience and further learning of the language in this format. Thus, the conscious-comparative method has brought its fruits to the methodology of learning a foreign language. Analytical and synthetic reading were developed on the basis of obtaining information. Features of monologue and dialogic speech were discovered, which influenced the teaching of speaking in the future. The conscious-comparative method was based on tasks aimed at updating the content of education, educating and shaping students' cultural and universal values [2]. Supporters of this methodological direction have raised the academic discipline of a foreign language to a new level. The second method, in contrast to the first, was that when learning a foreign language, students do not use their native language as a basis, and skills and abilities are formed directly in the speech situation that the teacher creates.

Somewhat later, scientists create a method that, on the one hand, involves avoiding the native language and language rules, on the other hand, does not prohibit its use in analysis at an advanced level. Thus, analysis of texts was allowed, which included translation, comparison of a foreign language with a native one.

The combination of ideas from the direct and conscious-comparative methods contributed to the creation of a new method, which was called mixed and was used mainly in the 30s of the last century. The mixed method was considered and applied by Methodist scientists in different ways, this is evidenced by their views expressed in scientific articles, manuals and textbooks. K. A. Ganshina [1946], I. A. Gruzinskaya [1938], A. A. Lyubarskaya [1938] noted that all types of speech activity, with a relative emphasis on reading during learning, should contribute to the development of students, what is the goal teaching a foreign language. The main task was, first of all, the education of patriots of their country, and therefore the textbooks of that time contained information about their native country, the compilers ignored the country of the language being studied [10]. Most of the methodologists, who use the mixed method in their practice, divide the material into two types of speech activity: receptive and productive. To the first they refer listening and reading, and to the second - writing and speaking. According to the German writer and teacher F. Aronshtein, and I.A. Gruzinskaya (1938), receptive language acquisition is realized consciously, relying on the native language, while productive one basically involves imitation of monolingual exercises.

The mixed method proposed teaching grammar, which includes three stages. At the first stage, grammar learning occurs intuitively. This means that students are immersed in grammatical aspects without fully understanding certain rules. At the second stage, students must rely on the rules and patterns inherent in the language being studied. At the third stage, the teacher systematized and consolidated the studied material [10]. The ideas of the direct method in the mixed method were modified and the use of the native language in teaching a foreign language was allowed in relation to the semantization of lexical units and the control of students. Another feature of this method was the presence of an initial course of teaching a foreign language, which includes teaching mainly oral speech and reading. This method, based on the intersection of two fundamental teaching methods, contained a huge potential and made a significant contribution to the process of teaching foreign languages.

In modern conditions, the ultimate goal in teaching a foreign language is seen in the development of foreign language communicative competence, the achievement of which is unthinkable without such important components as the formation of the personality of students, the ability to independently extract material using information technology. The task of the teacher is to create the necessary conditions for the formation of communicative competence, while using modern teaching aids. The conditions for mastering a foreign language should be favorable and close to reality, because the communicative method consists in creating real situations of communication in life, in transferring the student to the world of a foreign language.

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十九世纪后半叶至二十世纪初，教育组织在印度民族解放斗争中的活动  
**THE ACTIVITIES OF EDUCATIONAL ORGANIZATIONS IN THE  
NATIONAL LIBERATION STRUGGLE OF INDIA IN THE LAST  
QUARTER OF THE XIX - EARLY XX CENTURY**

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这篇文章致力于印度的独立发展时期（十九世纪的最后三个季度 - 二十世纪中叶）。这一时期，妇女问题是印度亟待解决的问题，民族意识的觉醒，印度解放运动的兴起，以其尖锐之势，提出了妇女解放的方式方法问题。主要任务之一是将妇女从古老的传统和观念的束缚中解放出来，因为印度社会的社会和日常生活中的不人道和残酷正是与妇女有关。

关键词：印度、印度妇女、印度民族解放运动、意识形态、印度教育工作者、教育组织、国家新闻界、女作家和诗人。

**Abstract.** *The article is devoted to the period of independent development of India (the last quarter of the XIX century - the middle of the XX century). During this period, the women's question was an urgent problem in India, the awakening of national consciousness, the rise of the liberation movement in India, with all its acuteness, put forward the question of ways and means of women's liberation. One of the main tasks was the liberation of women from the fetters of age-old traditions and ideas, since it was in relation to women that the inhumanity and cruelty of the social and everyday life of Indian society were most clearly manifested.*

**Keywords:** *India, Indian women, Indian national liberation movement, ideology, Indian educators, educational organizations, national press, women writers and poets.*

The Indian national liberation movement over a long period of development has gone through a difficult path and was distinguished by the originality of the forms and methods of struggle, inconsistency and class heterogeneity. This is the

result of the peculiarities and specifics of the socio-political and economic development of India under the conditions of colonial enslavement.

The Indian national liberation movement was led by the national bourgeoisie, which began to form into a class as early as the XIX century, much earlier than in other colonial countries. The ideology of the national liberation movement was born in Hindustan "as a special direction of the emerging national consciousness of the peoples, as well as an ideological trend that reflected their historical ties, the mutual influence of cultures, common destinies and interests in the struggle against foreign domination".

At all stages of enlightenment, in all educational programs, the main demand was to improve the position of the Indian woman, isolated by centuries of tradition, customs and colonial orders from participation in the public life of the country.

The vast majority of Indian women were illiterate. In India, during the colonial period, only women from wealthy families could receive an education.

The progressive public of the country, and above all the Indian educators, could not come to terms with the disenfranchised position of Indian women. Ram Mohan Rai, addressing the orthodox Hindus, wrote: "The shortcomings that you attribute to women are not inherent in their character by nature, and therefore it was very criminal, as a result of a single precaution, to condemn this sex to death. By attributing all kinds of indecent behavior to women, you have indeed successfully persuaded Indian society to look down on them as despised and unworthy creatures [1]. On this occasion I would like to make a few remarks.

In general, women are physically weak and less energetic than men. As a result, the men of our society took advantage of their weakness, began to deny in women the virtues to which they are entitled. They argue that women, by their very nature, are not entitled to a decent position in our society. How can you blame them? In a country where the very word "death" makes a man shudder, a woman is so strong in spirit that she herself offers herself alive to be burned along with the body of her deceased husband. And yet you still accuse her of a lack of determination!" [2, p.78-82].

Enlighteners of India associated the revival of the country with the enlightenment of the people and the emancipation of women. They demanded greater rights and freedoms, the abolition of child marriage, the abolition of the prohibition of the marriage of widows, the recognition of the right of women to own property, i.e. for the destruction of all the old medieval feudal institutions that humiliate Indian women. Already in the first half of the XIX century, various educational organizations were created, the purpose of which was the elimination of the caste system or its modernization, the promotion of women's education, the abolition of child marriage, etc.

The ideas of enlightenment quickly reached the masses precisely through the press, which in the last quarter of the XIX century became a mirror of the political

sentiments of the intelligentsia, the urban petty and middle bourgeoisie. The role of the national Indian press is exceptionally great in the development of the national liberation movement in the country of national consciousness of the Indian people. The Indian press, despite the different political orientation of newspapers and magazines, expressed the thoughts and feelings of all the peoples of the country, it was united by an anti-imperialist orientation.

The national press paid much attention to the plight of Indian women. For the first time, women's magazines and newspapers began to be published in India, and special women's magazines were published in every province of British India. Their editors and publishers were women educators, many of whom published anonymously in the press. The most mass-circulation press for women was published in the developed province of India at that time - Bengal. So, what women's magazines were published in Bengal from 1860-1910 [3, p.214-218]. For example, "Bamabodhini Patrika" - a monthly magazine founded in 1863 in Calcutta by Ushaprava Datta, the press organ of the women's organization Bama-bodhini Sabha; Banga Mohila is a bi-weekly magazine founded in 1870 in Calcutta. It is assumed that its publisher was Mokshada Debi (Banerjee) Mukherjee. The magazine paid special attention to the position of women in India, called for expanding their rights; "Anathini" is a monthly magazine founded in 1875 by Julian Thakomoni Debi Chattopadhyaya; "Bharati" is a monthly literary magazine founded in 1877 by D. Tagore. From 1895 - 1897 its editors were Hironmaya Debi and later (1898) - Rabindranath Tagore. "Hindi Lalana", a magazine published by anonymous female editors with the initials B.B., founded in 1878 in Nawabganj; "Paricharika" - a weekly magazine, was the mouthpiece of the "Brahmo Samaj" society, since 1887 it has become the printed organ of the "Ariya Nari Samaj" society. The purpose of the magazine is to promote education among the women of Bengal. "Christia Mahila" is a monthly magazine founded in 1881 by Kamini Seal in Calcutta, which published the works of only women - writers and poetesses.

A certain contribution to the development of Indian enlightenment was made by women writers and poets. The main theme of their work was the problem of women's emancipation, personal and social. Most of their works are written in Hindi, Bengali, Marathi, there are also works translated from Sanskrit, English, French.

The works of Bhubansundari Dasi, Indubala Dasi, Krishnabhabini Dasi, K.K. Debi, the same motifs sound in the prose of Basantakumari Roy, Hemangani Debi, Mankumari Datta Chaudhuri Bose and other writers [4, p.123-129].

One of the best poets of that time, Nagenjabaly Mustafi (1878 - 1906), advocated the emancipation of women, promoted enlightenment, condemned many conservative customs. At the end of the XIX century, Kusumkumari Roy Deby's drama "Snehalata" (1889) was popular in Bengal, which was popularly called one

of the best books on the social status of women in Bengal. The same problem is shown in the dramas of Lakshmimoni Debi "Chira Sanyasini" (1872), Kesabamohini Dasi "Mathuri" (1893).

The poetesses and writers of India at the end of the XIX century contributed to Indian enlightenment, to the development of national literatures: their works aroused a sense of patriotism among the people, instilled heroism and courage in the youth, drew public attention to acute social issues, aroused public consciousness, forced to think about the situation of Indian women. Women who give life and joy on earth suffer in the grip of caste, religious and racial prejudices, they cannot be happy in the family and society.

Poets, writers, journalists, as a rule, were members of numerous educational organizations in various provinces of the country.

Enlightenment societies created in the second half of the XIX century were very active - this is "Betun Sosayti" [5, p. 88], at whose meetings issues of art, literature, science, and education for women were widely discussed. "The Society for Social Improvement", led by Debendranath Tagore, founded a special comprehensive school for girls. Or the "Bidnotsahini Sabha" in Calcutta, which advocated the marriage of Indian widows and established a bonus of 1000 rupees for those who marry a widow. "Prarthana samaj" [6, p.214-218] in Maharashtra, its members advocated inter-caste communication, prohibition of child marriages, created widows' homes and orphanages. Many of these organizations had branches in various cities in India. "The Widows' Marriage Association" was active in Bombay, the "League of Hindu Widows" in Lucknow, and the "Maharani School" in Mysore.

For example, "the Widows' Marriage Association" was engaged in promoting marriages for Hindu widows and acted as local compradors in the colonial government's project to pass a law allowing such marriages, which were prohibited in Hinduism. [7][https://www.hmong.press/wiki/Justice\\_Ranade](https://www.hmong.press/wiki/Justice_Ranade) These were mainly social and educational organizations trying to alleviate the situation of Indian women.

In the 1980s, Aghorekamani Roy, a Bengali woman, founded the Aghorekamani Nari Samiti women's association, which fought for the empowerment of Indian women in society.

In 1896, the daughter of Debendranath Tagore, Swarna Kumari Devi, created the women's educational organization "Sahi Samiti", which developed a system of teaching Indian women at home. The association provided widows and orphans with money, annually organized exhibitions and fairs of hand-spun products of women from different parts of India.

From 1907 to 1910, with the help of educational associations, three new colleges were opened for Indian girls in Bengal.

The movement for social reforms has taken on a wide scope in the province of Maharashtra as well. In the 60s of the XIX century, the Marathi version of the "Brahmo Samaj" was created - the religious-social-reformist society "Prarthna Samaj". The members of this society were the largest scientists, public figures of India of that time. They created orphanages and widows' homes, evening schools, demanded reforms in the country.

In 1983, one of the best representatives of the intelligentsia, Dr. Dhondo Kes-hat Karve, opened the "Society of Hindu Widows" in Pune, the purpose of which was to protect them from persecution, provide housing, and teach crafts. Speaking for the equality of women in society and, above all, in the family, D.K. Karve noted that "the social status of men and women should be the same and that women should be given the opportunity to participate, together with men, in the affairs of not only the household, but also the city and the nation" [8].

In an effort to implement the idea of female emancipation, the enlighteners organized in 1890 the so-called joint meals of married couples (according to the laws of Hinduism, a joint meal of men and women is prohibited). So, during a joint meal, held in one of the parks of Pune with the participation of seventy married couples, speeches were made about the need to recognize the authority of Indian women and grant them civil rights.

In 1890, in Bengal, a certain Harimohan (aged 38) demanded that his eight-year-old wife perform marital duties, which led to the death of the child. This case was widely covered in the educational official press. The reformists asked the government to pass a law banning early marriages. In 1891, the Council under the Viceroy of India supported the reformists and issued a bill raising the age of marriage for girls from ten to twelve. The bill caused a wave of indignation among orthodox Hindus. In Maharashtra, during its discussion, opponents of the new law committed reprisals against its defenders.

But no obscurantism was able to stop the development of social progress. New educational organizations and societies continued to spring up throughout the country. Indian reformers believed that individual reforms, the issuance of laws, could alleviate the position of the Indian woman and the whole people. These disparate organizations did not have specific tasks. However, the creation of these organizations, advocating the enlightenment of the masses, the breaking of old feudal relations and traditions, was, of course, a progressive phenomenon.

In the last quarter of the XIX century, educational organizations advocated the emancipation of Indian women, for granting them the rights and freedoms that they sought for the whole country. It was during this period that Indian women were actively involved in the public life of the country.

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**KALMYK PRINCE TUNDUTOV - DEPUTY OF THE FIRST STATE  
DUMA OF RUSSIA**

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1906年4月27日，第一国家杜马在圣彼得堡的陶里德宫开始工作，经过几个世纪的专制主义，它成为民主变革的象征。

少数民族第一次被赋予在全俄政府中的代表权。卡尔梅克草原的第一任副手（甚至在卡尔梅克人于1920年获得国家地位之前）是王子家族的代表 - Tseren-David Tundutov。

伏尔加格勒州 Svetloyarsky 区 Solyanka 村的庄园公园保存了这个人的记忆。

关键词：通杜托夫、国家杜马、索良卡、佛教。

**Abstract.** *On April 27, 1906, the First State Duma began its work in the Tauride Palace in St. Petersburg, which became a symbol of democratic transformations after centuries of absolutism.*

*For the first time, national minorities were given the right to be represented in the all-Russian government. The first deputy from the Kalmyk steppe (even before the Kalmyks gained statehood in 1920) was a representative of the princely family - Tseren-David Tundutov.*

*The memory of this man was preserved by the manor park in the village of Solyanka, Svetloyarsky district of the Volgograd Oblast.*

**Keywords:** *Tundutov, State Duma, Solyanka, Buddhism.*

In Russia, at the end of March 1906, the rules for holding elections to the State Duma in the areas occupied by "nomadic foreigners of the Astrakhan and Stavropol provinces" were approved. According to the rules, it was supposed to elect one deputy from the assembly of electors of the Kalmyk uluses and settled settlements, some of which were located on the territory of the modern Svetloyarsky district of the Volgograd Oblast. Note that there were no representatives from the Tsaritsyn uyezd of the Saratov province in the Duma.

The elections were held in two stages. At the first stage, 11 electors were elected, and then a State Duma deputy from among them. In the Kalmyk uluses and settled settlements of the Astrakhan province, the election of electors took place on April 18, 1906, and in the Bolshederbetovskiy ulus of the Stavropol province only on May 12, when the Duma had already begun its work.

The Kalmyk noyons (princes) - Tseren-David Tundutov from the Maloderbetovskiy ulus (part of which was located on the territory of the modern Svetloyarsky district of the Volgograd Oblast) and Mikhail Gakhaev (Bolshederbetovskiy ulus) fought for the deputy place. Tundutov easily managed to get ahead of his opponent, but due to the protracted election campaign, he arrived late at the meetings of the first State Duma. This, by the way, explains the absence of the name and biographical information about Tseren-David Tundutov in a number of reference books about the deputies of the State Duma. And where he is indicated, his nationality is often erroneously indicated - Kyrgyz.

The First State Duma worked for only 72 days: from April 27 to July 8, 1906. A significant part of the deputies from the "non-Russian lands" and nationalities joined the main party of the liberal bourgeoisie - the Constitutional Democratic Party (cadets). A Kalmyk deputy, who also became a member of the Duma Agrarian Commission, also joined this fraction. In it, Tundutov launched a campaign in favor of a series of reforms in the Kalmyk steppe. Tundutov also raised questions about the boundaries of the national territory, which received a special administrative and economic status up to the creation of a national territorial autonomy (which arose only in 1920).

Heated debates on agrarian issues did not proceed as the tsarist government would have liked. In fact, the Duma turned out to be much "to the left" than expected, and already on July 8, 1906, it was dissolved by Emperor Nicholas II.

Despite the fact that the demands of the deputies, including those of Tseren-David Tundutov, remained only on paper, the fact that national minorities were admitted to the State Duma was undoubtedly a positive development. This, no doubt, contributed to the awakening of national consciousness and the activation of the national movement on the outskirts of the empire.

The Tundutovs were considered one of the oldest families of the Kalmyk princes. Their genealogy, dating back to the time of Genghis Khan, is covered in a fog of historical legends and traditions.

"In the Kalmyk people, the Tundutov family was considered sacred," writes scientist A.Sh. Kichikov. – They were called "Tenger Yozurta", i.e. heavenly origin... Among the ancestors of Tseren-David was Jambo-taishi - the hero of the Patriotic War of 1812 and foreign campaigns of 1813 and 1814. [Balinov, 1936. p.12.]

Tseren-David Tundutov was born in 1859. He graduated from the Moscow Katkov Lyceum named after Tsarevich Nicholas, and, according to his contemporaries, was a combination of European culture with a deep knowledge of Tibetan sciences and Buddhist philosophy.

Studies in science and literature did not prevent him from spending most of his time among his people and actively participating in the social and political life of the Kalmyk steppe. Having laid down his property rights in 1892, he remained respected and loved among his fellow tribesmen, who, in matters of domestic and national life, did not recognize anyone except him.

Tundutov obtained permission from the Astrakhan governor to hold congresses of large Kalmyk pastoralists to discuss topical economic and national issues. Before the Chairman of the Committee of Ministers of the Russian Empire, S.Yu. Witte, Zeren-David initiated consideration of the issue of national equality and, first of all, the equalization of the rights of Buddhists with the Orthodox. He also had the intention of transferring the entire Kalmyk people to the Cossack estate and the creation of the Kalmyk Cossack army or its merger with the Don or Astrakhan Cossacks [History of Kalmykia from ancient times to the present day, 2009. v.2. p. 94].

Tundutov and his wife, Princess Elzete, maintained national and religious traditions. Elzete was fond of Buddhist philosophy, religion, Kalmyk ethnography, and geography. Her advice was used by scientists of the Imperial Russian Geographical Society, of which she was a member. Elzete donated her collection of Kalmyk national costumes to the Geographical Society. This collection later ended up in the Museum of Ethnography in St. Petersburg [Borisenko, 1993, p. 15-17; Report of the RGS, 1904].

The Tundutovs had a lively relationship with the head of the Buddhists, the 13th Dalai Lama, who, as a token of his special favor, presented a special seal of the "eternal visa", in front of the owner of which Tibet opened its gates. Being some kind of the first Kalmyk patrons, they completely subsidized the trip to Tibet of the famous monk Baaz Menkedzhuev. At the personal request of Tseren-David, he wrote travel notes for his three-year pilgrimage [Pozdneev, 1897].

The Tundutovs supported their son's childhood friend Danzan (the future famous scientist and educator Nomto Ochirov) by fully covering his expenses for studying at St. Petersburg University. Nomto Ochirov is primarily known for the fact that, while still a student, he first recorded and published the oral Kalmyk epic

"Dzhangar".

In the Svetloyarsky district of the Volgograd Oblast, a unique place has been preserved associated with the life and work of Tseren-David Tundutov and his son Danzan, the last Kalmyk prince. This is the territory of the former estate of the Tundutovs in the tract Zosta (Solyanka) of the former Maloderbetovskiy ulus of the Astrakhan province. True, there are no traces of the palace destroyed by the Bolsheviks, nor numerous outbuildings. The foundations of the suburgan (stupa) are barely visible, where in 1907, after a Buddhist rite, the ashes of Tseren-David Tundutov were buried. Orchards and vineyards perished, thickets or shallowed cascading ponds in which fish were bred.

Tseren-David Tundutov became a noyon on June 1, 1874. He owned the ulus until the law of March 16, 1892, which abolished feudal dependence and deprived the noyons of their subjects. The Treasury paid them compensation in the amount of a five-year tax, according to the number of kubitkas (wagons).

Trying to achieve justice, Tseren-David in 1902 filed a petition in the name of Emperor Nicholas II. In the petition, he mentioned the merits of his ancestors and the fact that his surname was placed in an unequal position with the former noyon of Tyumen (a descendant of Serebdzhap Tyumen, who entered Paris first in 1814) and who had more than 10 times more land.

Tundutov wrote that he proved his economic abilities by growing a vast and exemplary orchard in the Solyanka tract, diligently plowing, and horse breeding, which are considered the best in the steppe, and asked to allocate additional land to him.

The authorities requested a certificate from the trustee of the Maloderbetovskiy ulus, V. A. Khlebnikov (with whom Tseren-David was friends), the father of the famous poet Velimir (Vladimir) Khlebnikov. The certificate stated that in the possession of Tseren-David Tundutov are:

- Lapshinsky land near the village of Tsatsa, with an area of 2533 acres;
- a farm in the tract Abdzhin with 3 houses - the former estate of the merchant Saburov (510 acres of fishing water and 2217 acres of floodplain meadows);
- 2-storey stone house in Tsaritsyn;
- a house in Sarepta (the Tundutovs maintained close contacts with the Lutheran community in Sarepta: in particular, the wife of the Sarepta tanner Aikhenauer worked as a housekeeper on the estate);
- Solyanka estate.

By the beginning of the XX century, the Solyanka estate occupied over 288 acres. On the site there was a stone 2-storey palace, 14 wooden outbuildings (residential cottages, guest houses), sheds, barnyard stables, plantations, arable land. There was also a sume (prayer house) here [Burchinova, Komandzhaev, 1989. p. 41.].

In 1889, the Tikhoretskaya branch of the Vladikavkaz railway was built, linking Tsaritsyn with the Caucasus. Tundutov provided financial assistance to the board of the joint-stock company of the Vladikavkaz railway in the construction of the Chervlenoe station closest to the estate (about 3 km), which was renamed Tundutovo at the end of the XIX century. In 1953, the station was renamed Kanalnaya (in connection with the Volga-Don shipping canal laid nearby).

The son of Tseren-David and Elzete - Danzan-Cherdzhal (Dmitry Davidovich) was born in 1888. He graduated from the Corps of Pages. In 1908 he entered the Grodno Hussar Regiment in Warsaw as a cornet in the Life Guards. He married the daughter of General Briger Xenia Alexandrovna.

In 1911 Danzan retired and traveled abroad for 2 years. But in March 1914 he returned to the army, entered the general staff as an officer, and then became the adjutant of the Supreme Commander-in-Chief - Grand Duke Nikolai Nikolayevich. In December, he was promoted to the rank of lieutenant. With the consent of the Grand Duke, Danzan and his friend, the orientalist Nomto Ochirov, toured the Kalmyk steppes of the Astrakhan province, agitating for the transition of the Kalmyks to the Cossacks - which Tseren-David suggested, hoping to achieve equality between the Kalmyk and Russian peoples and stop the plunder of land.

After the February Revolution of 1917, the peasants near the village of Chapurniki began to divide and plow the ancestral land of the noyon. In June, in Petrograd, Tundutov and Ochirov proposed at a meeting of the Astrakhan, Don Kalmyks territorial association and transition to the Cossacks. Negotiations began with the Astrakhan and Don troops on their acceptance. In May-June, Danzan traveled to Novocherkassk for negotiations with the headquarters of the Don Cossacks, but the Don Cossacks refused. At the end of September, the Astrakhan army agreed and Danzan Tundutov was elected a comrade (deputy) of the ataman of the Astrakhan army, and soon, the ataman [History of Kalmykia from ancient times to the present day, 2009, v.2. p. 152].

In March 1918 the estate in Solyanka was destroyed by artillery fire. Priceless relics from the time of the Patriotic War of 1812, a library consisting of books and manuscripts in European and Oriental languages, perished in the fire.

On June 11, D. Tundutov set off by ship from Poti to Europe (Berlin) at the head of the delegation of the South-Eastern Cossack Union to ask for help in Europe. Negotiated with the German Foreign Ministry. He met with Kaiser Wilhelm II, who decided to provide material assistance to Tundutov to create a new Cossack army [History of Kalmykia from ancient times to the present day, 2009, v.2. p. 209].

In August 1918, the Astrakhan army began the first battles with the Salsk partisans in the area of Kuberle station. At the same time, as part of the Don Army

of General S. V. Denisov, the division fought near Chervleny in the direction of Tsaritsyn. At the end of August, the Tundutov division and the Astrakhan combined officer regiment took Raygorod (the nearest settlement to Tsaritsyn).

On October 4, 1918, Danzan Tundutov issued a Regulation on the intention to turn the Astrakhan Krai into a Cossack state entity. But on October 15, in the battle near Bolshiye Chapurniki, the Volga detachment of the Astrakhan army was defeated by the Steel Division of D. Zhloba. The Tundutov division was unable to save the front, retreated, leaving the previously occupied settlements. In May 1919, Danzan Tundutov was removed from the post of ataman of the Astrakhan Cossack army and soon, he and his family went abroad.

In 1922, succumbing to the agitation of A. Brusilov, Danzan Tundutov returned with his wife to Russia, and even worked in the inspection of the cavalry of the Workers 'and Peasants' Red Army (RKKA). But, soon he was arrested, convicted and, among other repressed, shot in Moscow, on the territory of the Yauza hospital [PMA].

In 1999, in memory of several hundred victims of political repressions who were shot in 1921-1926 and secretly buried in the yard of the 23rd (Yauza) hospital, the Andrei Sakharov Museum and Public Center erected a memorial stone. The irony of fate: Danzan was taken from the cellars of the Lubyanka to the execution along the street, which has the same name as the village where the family estate was - Solyanka.

Danzan's wife with her son, Nikolai, returned to Germany. Nikolai's daughter, Marina Nikolaevna Tundutova, married a direct descendant of A. S. Pushkin, Alexander Alexandrovich Grevenitsa (his mother, Natalya Pushkina). They had a son - Serge (Sergey) Aleksandrovich Grevenits, in whom the lines of two great families - Pushkin and Tundutov - converged.

After the Civil War, the territory of the Tundutov estate was part of the Krasnoarmeysky district of the Stalingrad district. Kalmyks from the village of Chervlennoe tried to create the "Ulan-Khalmag" agricultural commune here, but failed.

From the meager memories of travelers, and from ulus references, a picture of a vast estate emerges, where only one two-story stone (brick) palace had sixty (!) windows. The territory of the estate was carefully planned out. In addition to gardens, vineyards, melon plantations, kitchen gardens and arable land, there was a landscape park with ponds, fountains, gazebos, and benches for relaxation. The surrounding fields and beams were a magnificent natural park for riding, the only analogue of which is, perhaps, Lugovoi Park in Peterhof near St. Petersburg. Naturally, the idea of reviving the estate, for example, as an Art Residence, has a lot of supporters.

The beginning of the revival of the Tundutov estate was laid on May 27, 2010, on the birthday of Buddha Shakyamuni, when the efforts of the Kalmyk republi-

can charitable foundation "Heritage" named after Nomto Ochirov, headed by its legendary Chairman Nina Sanjarikovna Ulanova, the Stupa of Enlightenment was erected - just a few tens of meters from the site of the historical suburgan. It was an exceptional moment: Buddhism, one of the four traditional religions of Russia, returned in the form of a religious building to the Volgograd land. Volgograd Buddhists have a holy place in every sense of the word.

As for the First State Duma, its significance as the first democratic state institution was enormous for representatives of the national outskirts of Great Power Russia, whose representatives for the first time received access to solving state problems. Elections to the State Duma in the national regions determined their heroes and leaders who led the process of raising national consciousness. One of these leaders, no doubt, can be considered Tseren-David Tundutov, an outstanding figure and reformer of the Kalmyk steppe.

The revival of the Tundutov estate and the creation of a historical, ethnographic and landscape museum-reserve on its basis would be the best monument to this extraordinary person.

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论节假日文化及其对年轻人的认知  
**ON THE ASPECT OF THE CULTURE OF HOLIDAYS AND THEIR  
PERCEPTION BY YOUNG PEOPLE**

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**Abstract.** *The subject of this article is the problem of modern Russian youth associated with the perception of holidays in a modern, democratic regime and market economy. The methodology of the article is based on the unity of the philosophical-culturological and cultural-functional approaches to solving the problem. The study uses a systematic approach, using materials on ethnography, local history, and religious studies. In the course of the research, the author relied on the works of E.V. Alekseeva, G.A. Andrients, V. Varnakov, T.N. Zolotov and others.*

**Keywords:** *holidays, youth, modern Russia, perception, culture, socio-cultural development, national identity, public consciousness*

Currently, as part of the aspect of studying the formation of the cultural identity of our country, we are increasingly returning to the culture of holidays, and their influence, especially on the younger generation. The cultural basis of the nation is changing through the formation of new values, and it is the festive culture that serves as the basis for the socio-cultural integration of the individual into society, which forms the consciousness of the youth of our country.

Festive culture is increasingly becoming an interdisciplinary phenomenon in humanitarian research and is considered by modern authors in such aspects as a festival, holiday, gender, leisure preferences of young people. Thus, we can conclude that, despite the variety of works that affect various theoretical and applied aspects of the festive culture, there is currently practically no research on the systematic study of this phenomenon.

We can refer to the works of A.S. Makashova, where she notes that at the end of the XX century, Russian festive culture gradually became part of the global process of sociocultural development. The reason for its exceptional importance is

the division of the events of Russian history in the XX and XXI centuries: revolutionary change in the political regime of 1917, participation in the bloody World War II, the Soviet totalitarian period, the collapse of the USSR and the crisis of the nineties [3]. Over the past fifteen or twenty years, the question of the goals of the historical and cultural process in Russia has become extremely important, and the problem of finding criteria for national identity is an idea that has become quite important. There was a need to unite the relatively differentiated population of the country into a single whole.

However, at present, we can observe a general decline in the cultural level of the population, especially among young people. Modern man under the influence of fast processes does not have time to rethink his role and place in society. And here, we can say that the recognition of the socio-cultural diversity of the modern world highlights the problem of the disappearance of national culture. The modern festive culture of Russia today is undergoing significant changes at all levels.

Festive events contribute to moral and spiritual development. Holiday dates that were in the previous Russian official "Calendar of Holidays" remained, but not all. This allows us to point out the dynamics of culture in its historical aspect. As another important characteristic of modern Russian festive culture, it is important to note that it reflects the values and meanings inherent in the Russian mentality - a commonality that remains in the public mind, regardless of all the ongoing political and socio-economic changes. In general, modern holiday culture can be considered as a special form of cultural memory of the people, reflecting its essence and structure as the most important foundations of national identity. Festive culture is a specific, symbolically reworked image of the past, the events of the country's history, which influences the formation of the mentality of modern youth.

And for the positive aspect of the influence of the festive culture, its constant support is required from representatives of the state, public organizations, social groups, individuals, and so on.

The presence of traditional and innovative components in the national festive culture of our time is due to a specific attitude to the past, as well as special mechanisms for shaping the cultural memory of Russian society in the structure of a particular festive event. In this case, the festive culture of modern Russia itself becomes a reflection of the politics of memory aimed at preserving certain moments of our historical past [1].

Another important factor in the culture of holidays in Russia is the influence of the mythological component. The spread of mythological meanings is largely due to the same phenomenon of the media, with which the holiday today retains its closest connection [4]. The influence of mythology can be twofold, where one of the components can be the distortion of historical reality and the substitution of

some views on the past of the country by others [2].

The repetition of holidays in the country from year to year serves as the basis for the formation in society of an integral system of memories of the past of the country, and the festive culture in this case serves as a structural mechanism for the formation of people's memory, being a tool to support the identity of society. Festive culture serves as a regulator of society's attitude to the present and future.

Reconstruction holidays express, for the most part, the events of political history and have a decisive influence on the process of self-identification of society, allowing the citizens of modern Russia to answer the question "Who are we?".

When analyzing the culture of holidays in our country, we can say that we can observe a trend towards the formation in the Russian Federation of a new cultural memory with a fundamentally different understanding of past events, the creation of new principles of public consciousness, a new historical, cultural and national identity. We can define the modern young generation as carriers of a fundamentally new communicative memory, which forms the basis of a festive culture that is different from that in which previous generations existed [5].

Modern holiday culture as a special phenomenon of the spiritual life of Russian society is a factor of family, professional, confessional integration, which ensures the connection of individuals into a socio-cultural unity.

Thus, we can conclude that the culture of holidays in Russia serves as a means of additional stimulation of the creative activity of the individual, a factor stimulating the formation of national and cultural identity, especially for the relatively young generation. Festive culture serves as the basis for the continuity of generations [6]. In addition, the general state of the festive culture is the most important indicator of the current processes of social and cultural changes taking place on the territory of the state. Due to this, the modern Russian festive culture is a special combination of traditions and innovations, a mechanism for ensuring the national and political self-identification of the individual and society as a whole, the emphasis is not only on traditional Russian values, but also on universal ones. In addition, we can talk about the need to develop a festive culture, as this is due to a number of factors, including the spiritual development of our country, the creation of continuity between the generations of Russian society, and many others. That is why the process of developing a festive culture should be accompanied by elements of aesthetic and moral education of young people. The culture of holidays can be understood by us as a mechanism for ensuring the preservation of symbolic information about the events of history, recorded in the theme of the holiday, thereby having a significant positive impact on the upbringing of our young generation.

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与肥胖相关的饮食失调女性的自我形象特征  
**FEATURES OF THE SELF-IMAGE IN WOMEN WITH EATING  
DISORDERS ASSOCIATED WITH OBESITY**

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这篇文章描述了一项关于肥胖相关饮食失调女性自我形象特征的研究结果。该研究涉及 60 名因肥胖而接受减肥治疗的女性。根据自我形象分离的严重程度将样本分为4组。根据研究结果，描述了自我形象分离严重程度不同的4组患者的进食障碍特征、自我态度和认同水平。

关键词：饮食失调，肥胖，自我形象。

**Annotation.** *The article describes the results of a study of the features of self-image in women with eating disorders associated with obesity. The study involved 60 women undergoing bariatric treatment for obesity. The sample was divided into 4 groups according to the severity of the dissociation of the self-image. According to the results of the study, the features of eating disorders, self-attitude and the level of identity in 4 groups with different severity of the dissociation of the self-image were described.*

**Keywords:** *eating disorders, obesity, self-image.*

The problem of obesity is one of the global medical and social challenges. According to WHO data for 2016, about 15 percent of women and 11 percent of men suffered from obesity in the world. And approximately two billion people over the age of 18 were overweight. Obesity is associated with such somatic risks as the development of cardiovascular diseases and metabolic disorders, which significantly affects the quality and life expectancy. It is believed that most cases of obesity develop as a result of eating disorders, and are referred to as the so-called primary or exogenous-constitutional type. (Isachenkov O.A. 2015). The mechanism of its development: an excess of energy coming from food and a lack of its expenditure, as a result of hypodynamia. In 98 percent of cases, obesity is associated with deviations in nutrition. (Fedorova S.S. 2018) Weight gain can be either a consequence of an eating disorder, such as, for example, psychogenic overeating or bulimia, or a consequence of subclinical eating disorders, which, according to various sources

es, occur 2-5 times more often than clinical forms, that is, they affect between 4 and 16 percent of the population. (Skugarevsky O.A. 2007) In the works of T. Van Strien and S.C. Grunert identifies three main types of eating disorders: external, emotional, and restrictive. The external type of eating is reflected in the tendency to haphazard eating, when eating occurs in response to the appearance of food, and not based on hunger. Emotional type of eating behavior can be described as eating under the influence of emotions, as a reaction to emotional discomfort.

The restrictive type of eating behavior is reflected by the presence of pronounced dietary restrictions, often unsystematic, which ultimately provoke overeating. (S.C. Grunert S.C.1989) J. Polivy and C.P. Herman. In their opinion, people who are prone to overeating have an overestimated border of saturation and hunger. Attempts to consciously regulate it through severe restrictions lead to failures in the diet. The authors called this phenomenon "counter-regulation". The trigger for the end of the period of restrictions, as a rule, becomes stress. Researchers state a paradoxical fact: a strict diet can lead to weight gain. (Polivy J., Herman C.P. 1999). It is important to note that while psychological features in eating disorders have been extensively studied, for example, in bulimia and anorexia, there is insufficient data on subclinical variants. The purpose of this study was to identify the features of the self-image in women with eating disorders associated with obesity. The study was conducted at the Center for Bariatric Surgery of the Moscow Scientific Clinical Center named after A.S. Loginov, the sample consisted of 60 women undergoing bariatric treatment for obesity. The sample included respondents over 18 years old, the average age of the subjects: 40 years. The self-image in the context of this study is considered as an integrative formation that reflects the totality of an individual's knowledge about himself and is used to regulate activity (Oshanin D.A. 1973). As components of the self-image, most authors distinguish: cognitive, evaluative-reflexive or affective and behavioral. These components are described in more detail by E.T. Sokolova: cognitive, interpreted as a set of ideas about one's qualities, appearance, attitudes of others, evaluative-reflexive or affective, reflects the characteristics of self-esteem and behavioral - how motives and goals are realized in activity. (Sokolova E.T. 2010) On the basis of this classification, a battery of methods was selected to explore various features of the components of the image of the self-image in women with eating disorders. The cognitive component was studied using the methodology for studying personal identity (MILI) and the modification of the "Self-portrait" methodology in order to study the dissociation of the image of the self-image (V.B. Nikishina, E.A. Petrash). The affective component was assessed with the help of the MIS methodology (S.R. Panteleev), which allows studying such aspects of self-attitude as "closeness", "self-confidence", "self-guidance", "reflected self-attitude", "self-worth", "self-acceptance", "self-attachment", "internal conflict", "self-accusation". The behavioral component was assessed using the Food Preference Questionnaire,

which measures the risk of having a clinical form of eating disorder, and the Dutch DEBQ, which identifies the type of eating disorder: emotional, restrictive, or external. At the first stage of the study, a sample of 60 people was divided into 4 groups according to the severity of the dissociation of the self-image based on calculations based on the modification of the "Self-portrait" methodology. The normal group (dissociation parameters within the normal range) included 21 people, the group with a violation of the body schema (low dissociation) - 11 people, the group with a violation of the body schema and the image of the sub-I (medium dissociation) - 19 people, the group with a violation of the body schema, the image of the sub-I and the transduction of thinking (high dissociation) - 9 people. Next, the parameters within the three components of the self-image in each group were analyzed in comparison with each other using the Mann-Whitney test. According to the results of the study, the following features of the components of the self-image in four groups were identified. The lowest average mass index at the level of a statistical trend was found in group 1 with a dissociation rate of about 37, which corresponds to the criteria for obesity of the 2nd degree. If in the results of comparisons between the second and 4 groups we cannot say about a significant difference, then with the third group it is statistically significant - in group 3 the average body mass index is more than 46, which meets the criteria for morbid obesity. In group 4 and in the second group, the average body mass index is about 40, which also meets the criteria for morbid obesity. Thus, we can conclude that the presence of dissociation of the image of self-image, regardless of the severity, is associated with the most severe form of obesity - morbid, when the weight exceeds the normal limit by 100 percent. There were no statistically significant differences in the risk of developing a clinical form of eating disorders in 4 groups, the average values on the EAT-26 scale do not exceed 16 points, the norm is in the range of up to 20 points, which at the level of a statistical trend can characterize all 4 groups as a sample with a low probability of having an eating disorder. That is, the presence of the dissociation of the self-image and the degree of its severity does not increase the risk of developing clinical forms of malnutrition in obese women. At the same time, an analysis of the severity of problematic types of eating behavior showed that at the level of average values in four groups, the indicators for three types of malnutrition exceed the normative values, that is, it can be concluded that women with obesity of varying degrees are characterized by eating disorders by the type of overeating, subclinical level. In the third group with an average level of dissociation, the external type of eating behavior is most pronounced, compared with the average values in groups 3 and statistically significant compared to group 4 with a general high level of dissociation. That is, women with a violation of the body scheme and the presence of the image of the sub-I tend to show field behavior in relation to food, as a stable trend. And here we can com-

pare these results with the study of body mass index in 4 groups, and conclude that the third group, where the average body mass index is the highest - about 46, is characterized by the highest rates of external overeating. Thus, we see that the behavioral component of the self-image in 4 groups with different degrees of dissociation of the self-image is presented as a subclinical malnutrition with pronounced manifestations of emotional, external and restrictive eating behavior. An increase in the level of dissociation of the image of the self-image to average values affects the severity of the external type of eating behavior and is associated with a higher body mass index. At the same time, in groups with a high level of dissociation, its absence, as well as in the group with violation of the body scheme, there were no significant differences in the type of malnutrition and its severity. Next, we will discuss the results of a comparative analysis of the cognitive component in 4 groups. At the level of a statistical trend, the respondents in all 4 groups are characterized by a pseudo-positive identity, but there is a statistically significant difference between groups 1 and 4. In the first group, as well as in group 3, at the level of average values, the identity indicators are on the border of pseudo-positive identity, closer to the achieved identity. At the same time, the level of average values shows that in group 4 the identity indicators are higher than in the sample as a whole. That is, we can conclude that the presence of a high level of dissociation is associated with hyper or pseudo-identity, which can result in total preoccupation with work, one's role or status. In this sample of women with eating disorders associated with obesity, in general, there is a tendency to emphasize their role, identify themselves through social status, and have a low level of reflection. Analyze the results of the study of the affective component in 4 groups, to begin with, we highlight significant trends. The first group is characterized by a lower level on the scale of reflected self-attitude, compared with groups with low and medium dissociation at a level outside of significant differences, and at the level of a statistical trend with a group with high dissociation. That is, women without self-image dissociation with eating disorders tend to have a more realistic and selective expected assessment from others. And women with low and medium levels of dissociation, on the contrary, tend to expect more acceptance from others in relation to themselves.

In the second group, with low dissociation, the level of self-confidence is significantly higher than in the normal group, and statistically higher than in groups with medium and high dissociation. Then for women with eating disorders associated with obesity and with a violation of the body scheme, but without transduction of thinking and the image of the sub-I, a sense of the strength of one's own Self, high courage in communication, in women in the norm group and in groups with high and medium dissociation – self-confidence is more related to the context and the current level of stress. Respondents in the group with a high

level of dissociation (Group 4) are characterized by a higher level of closeness, which is statistically significant compared to the normal group and the group with medium dissociation and at the level of a statistical trend compared to the group with low dissociation. That is, for women with a high level of dissociation of the self-image, a tendency to pronounced defensive behavior, a desire to comply with generally accepted norms is characteristic. Also, comparing the indicators of the level of self-attitude on all scales, it can be noted that, in general, the sample of women with eating disorders, regardless of the severity of the dissociation of the image of the Self, is characterized by average levels of self-accusation, self-worth, internal conflict and self-acceptance, which indicates a tendency to selective attitude towards oneself, mediated by specific circumstances and actual challenges of the environment.

Thus, we can conclude that the group with the norm of dissociation, compared with the groups with low, high and medium dissociation, is characterized by:

- the lowest average mass index (BMI about 37);
- a trend towards a more mature level of identity;
- a tendency to a differentiated perception of oneself in the eyes of others, that is, a more realistic reflected self-attitude.

The second group with a violation of the body scheme is distinguished by high self-confidence, which is not typical for women in the normal group, and by an average and high level of dissociation.

For the third group with an average level of dissociation, manifested in a violation of the body scheme and the presence of an image of the sub-I, the following are characteristic:

- the highest average body mass index (BMI about 46);
- the highest values for the external type of eating behavior, which manifests itself in a pronounced responsiveness to food stimuli, low awareness, combined with insufficient control.

The fourth group with a high level of dissociation is distinguished by:

- tendency to more pronounced pseudo-identity;
- a higher level of closeness, a tendency to defensive behavior.

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为市场经济中的创新活动培训医务人员  
**TRAINING OF MEDICAL PERSONNEL FOR INNOVATIVE  
ACTIVITIES IN A MARKET ECONOMY**

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**Relevance of the study** is determined by the needs of modern practical medicine in search of new ways to improve the training of personnel in the conditions of modern health care, adequate to the new socio-economic conditions for the development of our country, the requirements of modernizing education in Russia [1, 2, 3].

An analysis of the situation and a study of the needs of the labor market in medical personnel showed the need to form a new type of doctor: a researcher, designer, developer of new diagnostic and treatment technologies [2, 3].

The solution of this problem requires organizing the preparation of a future doctor for innovative activity in the conditions of modern health care, as the most important stage, which still trains a significant proportion of personnel and ensures that a specialist receives further professional knowledge at a higher level, contributing to his professional development and the formation of innovative potential.

**Purpose of the study** – theoretically substantiate and develop a technology for the formation of a future doctor's readiness for innovative activity in a market economy.

The object of the study is the professional training of a medical worker, the subject is the design of the process of forming a specialist's readiness for innovative activity in a market economy.

The study set a number of tasks: to identify the psychological features of the formation of the readiness of a future specialist for innovative activity in the conditions of modern health care; to carry out modeling of the process of forming the readiness of the future doctor on the basis of a system-functional analysis of his innovative activity; to determine the didactic conditions for the implementation of

the process of forming the readiness of the future doctor for innovative activities; to develop a technology for forming the readiness of a future specialist for innovative activity in the conditions of modern healthcare.

### **Material and research methods**

Our analysis was based on the provisions on the modern methodology of creative activity and the development of the doctor's creative personal qualities, on the features of the organization of research activities, and on the formation of a specialist's readiness for professional activity.

The following methods were used as the main research methods for solving the tasks set: theoretical and methodological analysis of literary sources; study and generalization of the experience of the medical staff of the republican clinical hospital; empirical methods (observation, questioning, interview, survey); forecasting and design.

### **Research results and discussion**

Increasing the effectiveness of the use of medical staff requires an innovative approach and the development of an evidence-based staffing strategy tailored to the specific health needs of the country.

The priority tasks for the development of medical education are to bring it into line with the modern needs of the individual, society and the state, improve the quality of education, ensure the training of highly qualified specialists who are competitive and mobile in the labor market, ready for further professional and personal development.

The innovative path of development provides for such an organization of socio-economic relations in society, which ensures the growth of social wealth and the growth of the well-being of its members through a constant increase in the productivity of the use of all resources and factors of production.

For the implementation of innovative activities, specialists are needed who own the methods, means and forms of managing the innovation process. Personnel training to ensure innovation processes is carried out mainly by higher, secondary specialized and additional education systems.

A type of education is needed that forms the orientation of students to problem situations that arise both before an individual and before society. The task is to teach future specialists not only to assimilate the material offered by the teacher (program, textbook), but also to learn about the world, entering into an active dialogue with it.

Innovative education is the process and result of such activity, which involves the use of new effective pedagogical technologies in order to form a socially active and professionally demanded personality.

On the basis of the research we have developed: a curriculum; tutorial; guidelines; questions for conducting intermediate and final control of knowledge, allowing to ensure a higher efficiency of training and the level of readiness of gradu-

ates for innovative activities. They are the tools of the systemic complex methodological support of the educational process, which provide two-way activity and include components to ensure the processes of teaching and learning in their unity.

The components of the programs are the means of normative support, the means of educational and methodological support, the means of training, the means of current and final certification, which are a project of a systematic description of the educational process implemented in practice. The program is a didactic means of managing the training of a specialist, a complex information model of the pedagogical system that displays its elements and structure.

E-learning tools have actively entered our lives, functioning on the basis of information and telecommunication technologies, creating prerequisites for intensifying the educational process, providing immediate feedback, computer visualization of information, automation of educational activity management and control of management results.

Didactic aspects related to the most general patterns of learning, and methodological aspects, determined by the specifics of teaching certain specific disciplines or groups of disciplines, are closely interconnected with each other, as well as with the software implementation of electronic learning tools.

Based on the software implementation, the following properties of the ESO are distinguished: the possibility of presenting and compactly storing information in its various forms - textual, graphic, sound, visual, multimedia; invariance of storage and presentation of information (on magnetic disks, flash drives, in printed form); the possibility of prompt transmission over any distance; possibility of remote access to information; the possibility of organizing interactive feedback with students; independence of the learning process from place and time.

The training of practice-oriented specialists who own new technologies necessitates the creation of modern material and technical, library and information equipment of an educational institution, unconditional provision of students' access to the global Internet. In order to achieve effective management of the quality of the educational process, a single information center has been created on the basis of the university.

The result of innovative education should be the formation of personal and professional qualities of a future specialist: a medical worker who considers a person as a whole person and who provides patients with high-quality comprehensive and continuous medical care; the decision-maker who chooses which ethical and cost-effective interventions should be implemented to provide patients with high-quality medical care; an advocate who is able to promote a healthy lifestyle through effective collaboration, education, education and persuasion, thereby motivating patients to maintain and improve their own health.

Improving the quality of education in medical specialties is possible only if:

the curricula are not overloaded with secondary disciplines; strengthening inter-disciplinary connections.

When developing a system for training healthcare professionals with an innovative character, the following problems were encountered that needed to be addressed:

The solution to these problems is supposed to be as follows:

- opening of new areas of training focused on the needs of practical health care and involving the satisfaction of the personal interests of students;
- diversification of professional educational programs with a variety of additional training programs and specializations, development of flexibility and variability of the content of education, maintaining its practice orientation;
- development of research activities of medical personnel and the formation of research activities of students;
- development and support of innovative professional educational programs, the use of new forms of organization of the educational process and new teaching technologies, the practice of organizing experimental work to test new ideas.

### **Conclusions:**

The process of forming a specialist's readiness for innovation will be more effective if:

1. A model is used to form the readiness of a future doctor for innovative activities, based on modern methodological approaches to specialist training.
2. The formation of a specialist's readiness for innovative activity is carried out in the conditions of an educational and research, professionally oriented environment, which ensures the innovative orientation of the educational and cognitive activity of students in the learning process.
3. On the basis of special technology, a continuous educational process is provided, taking into account the professional tasks solved by a medical worker in a market economy.

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神经递质代谢基因多态性与前列腺癌预后的关系

**POLYMORPHISM OF NEUROTRANSMITTER METABOLISM GENES  
AND PROGNOSIS OF PROSTATE CANCER OUTCOME**

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在具有高和低肿瘤生长率的前列腺癌 (PC) 患者中, 研究了神经递质代谢基因的多态性。 评估了四种神经递质代谢基因最显著的多态性: 血清素转运蛋白 SLC6A4 基因、儿茶酚邻甲基转移酶 (COMT) 基因、单胺氧化酶 A (MAOA) 基因和多巴胺受体基因 (DRD4)。 对于所研究的每种多态性, 各组之间存在差异, 对于 COMT、MAOA、DRD4 基因, 与精神疾病易感性相关的基因型更具有肿瘤快速生长患者的特征。 同时, 根据 SLC6A4 基因, 以精神分裂症易感为特征的基因型相反, 在肿瘤生长缓慢的患者中更为常见。

关键词: 前列腺癌; 前列腺特异性抗原; 疾病预后; 神经递质代谢基因; 精神疾病。

**Summary.** *In patients with prostate cancer (PC) with high and low tumor growth rates, polymorphisms of neurotransmitter metabolism genes were studied. The most significant polymorphisms of four neurotransmitter metabolism genes were assessed: the serotonin transporter SLC6A4 gene, the catechol-ortho-methyltransferase (COMT) gene, the monoamine oxidase A (MAOA) gene, and the dopamine receptor gene (DRD4). For each polymorphism studied, there*

*were differences between the groups, and for the COMT, MAOA, DRD4 genes, genotypes associated with a predisposition to psychiatric disorders were more characteristic of patients with rapid tumor growth. At the same time, according to the SLC6A4 gene, the genotype characterized by a predisposition to schizophrenia, on the contrary, was more common in patients with slowly growing tumors.*

**Keywords:** *prostate cancer; prostate-specific antigen; disease prognosis; neurotransmitters metabolism genes; psychiatric disorders.*

## **Introduction**

Prostate cancer is one of the most common malignant neoplasms in men. More than 400,000 cases of prostate cancer are diagnosed annually in the world; in a number of countries, it occupies the 2nd or 3rd place in the structure of oncological diseases after lung cancer and stomach cancer [1] (for example, in Europe in 2004, the incidence of prostate cancer was 214 cases per 100,000 men, resulting in prostate cancer ranked second among the leading causes of cancer death in men, ahead of lung cancer and colorectal cancer [2]).

It is well known that the pathogenesis of prostate cancer varies widely, ranging from extremely slow to explosive forms. However, the biomarkers and criteria that exist in the oncologist's current arsenal very often do not allow one to definitely predict the nature of the development of the tumor process. This necessitates further study of the pathogenesis of prostate cancer and the search for new predictors of tumor growth.

Among the reasons that may be involved in the development of prostate cancer, note: geographical location, age, infectious inflammatory processes, ethnic background, diet, sex hormones, hereditary factors [3].

At the same time, in addition to somatic mechanisms that prevent or, on the contrary, promote carcinogenesis, the psychological state of the patient, his emotions and temperament have a great influence on this process [4]. This is evidenced by numerous recent studies of the relationship between the psychological state of the patient, his social environment and the nature of the progression of oncological disease [5]. The effect of positive emotional factors on tumor regression has also been objectively confirmed in animal experiments [6].

Further, many parameters of temperament, character, emotional sphere of a person are genetically determined. These parameters are mainly regulated by the activity of the genes of the neurotransmitter system. Differences in activity are due to the structure of a particular gene, its polymorphic regions.

There are widely known works in which it was revealed that polymorphisms of the genes of the serotonin and dopamine systems cause a predisposition to aggressiveness, depression, bipolar disorders, suicide and, in general, deviant behavior [7,8].

Such polymorphisms and features of gene expression can occur in cancer pa-

tients, determine their emotional state, behavior, perception of the disease, and positively or negatively affect the tumor process.

At the same time, in addition to the emotional sphere, neurotransmitters are also involved in intercellular interaction and, thus, can participate in the pathogenesis of tumor growth at the cellular level as well. Therefore, the involvement of neurotransmitter metabolism genes in the tumor process may have a universal role.

In connection with the above, the purpose of our study was to determine the relationship between key neurotransmission genes and their polymorphisms that affects the activity of these genes with the nature of the cancer prognosis.

### **Materials and methods**

#### ***Selection of PC patients for genotyping***

This study was designed with the aim of comparing selected polymorphic gene variant presence in PC patients with either very favorable or utterly unfavorable variants (i. e. ‘polar opposites’) of disease prognosis defined by the doubling time of PSA concentration (PSADT) values measured before treatment initiation. Prognostically favorable cases (n = 67) were defined by the PSADT values exceeding 30 months, while a prerequisite for inclusion was a PSA history of at least one year. In some of these patients, the PSADT values could not be determined as there was no PSA concentration increase throughout the observation period. In contrast, cases where the PSADT values did not exceed two months (n = 40) were regarded as prognostically unfavorable.

#### ***Genotyping***

The most significant polymorphisms in four genes encoding regulatory proteins controlling neurotransmitter metabolism were selected for the study: the serotonin transporter gene (*SLC6A4*), the catechol-ortho-methyltransferase gene (*COMT*), the monoamine oxidase A gene (*MAOA*), the dopamine receptor gene (*DRD4*). All these genes are known to be associated with mental disorders: schizophrenia, depression, deviant behavior. The distribution of gene polymorphisms was assessed and compared in two groups of patients with PC characterized as ‘polar opposites’ in terms of disease prognosis.

Determination of polymorphism in STin2 VNTR of the *SLC6A4* gene was carried out using the method of polymerase chain reaction (PCR). The reagent kit “Encyclo Plus PCR kit” and a pair of sequence-specific primers were employed.

PCR results were assessed using DNA gel electrophoresis in 12% polyacrylamide gel, followed by staining with SYBR Green I (Lumiprobe, Russia) and visualization of the fragments in transmitted with 100 bp DNA ladder (SibEnzyme, Russia) used for fragment length determination.

The PCR used for the determination of *MAOA-μVNTR* polymorphism was carried out using the reagent kit “Encyclo Plus PCR kit” and a pair of primers synthe-

sized by Eurogen (Russia). The method used for PCR result visualization did not differ from that used for STin2 VNTR and described above.

To analyze the polymorphic Val158Met locus (472A>G, rs4680) of the *COMT* gene and the *DRD4* locus rs1800955 (-521 C/T promoter polymorphism), we used the SNP-express-RV reagent kits (Litekh, Russia) and SNP-Screen (Syntol, Russia), respectively, by real-time PCR using CFX96 Touch™ Real-Time PCR Detection System (Bio-Rad, USA) according to the manufacturer's instructions.

Determination of *DRD4* polymorphism (VNTR 48bp) was carried out using the "TAPOTILI - locus DRD4-VNTR" reagent kit (TAPOTILI company, Russia) by real-time PCR using CFX96 Touch™ Real-Time PCR Detection System (Bio-Rad, USA) according to the manufacturer's instructions.

## Results

Starting to study the genes of neurotransmitter metabolism, we identified groups of patients with prostate cancer, in which the comparative determination of these parameters would be of the greatest value. As we know, the death of an oncological patient occurs when the tumor reaches a critical volume incompatible with life. Therefore, the life expectancy of the patient is ultimately determined by the rate of tumor growth. Prostate cancer seems to be a very convenient model for this kind of research, since in these patients the dynamics of PSA concentration correlates quite well with the kinetics of prostate cancer. Comparing the dynamics of PSA concentration, and hence the probable dynamics of tumor growth, we formed two groups of patients with prostate cancer with extreme variants of the expected prognosis of the outcome of the disease, on whom we conducted a comparative study.

For the study, we selected the most significant polymorphisms of four neurotransmitter metabolism genes: the serotonin transporter *SLC6A4* gene, the catechol-ortho-methyltransferase (*COMT*) gene, the monoamine oxidase A (*MAOA*) gene, and the dopamine receptor gene (*DRD4*), which determine the activity of these genes and regulate many somatic processes, and are also associated with the nature of a person's temperament and predisposition to various mental disorders: schizophrenia, depression, deviant behavior, and assessed the difference in the distribution of polymorphisms in two polar groups of the prognosis of prostate cancer.

### *Patient genotyping results*

#### *SLC6A4 gene*

The presence of polymorphic variants of the *SLC6A4* gene encoding the serotonin transporter is associated with psychiatric disorders [9]. We performed genotyping of STin2 VNTR in the second intron of this gene in PC patients with unfavorable and favorable disease prognosis. The STin2 polymorphism is a region of variable repeats in intron 2 and includes two major alleles "STin2.10" and

"STin2.12", which correspond to 10 or 12 repeats (10R or 12R) 17 bp respectively. In addition, there are less frequent "STin2.7" and "STin2.9" alleles corresponding to 7 and 9 repeats respectively. Our results indicate that differences between the compared groups were observed in genotypes 12R/12R, 12R/10R, 10R/10R, as well as in homozygosity and heterozygosity for this locus in general. In particular, the 12R/12R and 10R/10R variants and homozygosity at the locus appeared to be associated with a better PC prognosis, whereas the 12R/10R genotype and heterozygosity at the locus were associated with a poorer PC prognosis.

It is also particularly important to note that the 12/12 genotype, which is protective against the rate of PC growth, and the 12/10 genotype, which predisposes to the rapid development of PC, reverse roles in relation to PC. Thus, according to several studies, the 12/12 genotype is predisposing to the development of schizophrenia, while the 12/10 genotype, on the contrary, is protective against this disease [10].

#### **COMT gene**

The *COMT* gene encodes catechol-O-methyltransferase (COMT), an enzyme that breaks down dopamine in the prefrontal cortex of the human brain. The Val-158Met polymorphism of the gene that leads to a decreased COMT activity in Met158 allele carriers (especially A/A homozygotes) was reported to be linked with neuropsychiatric conditions, such as alcohol dependence, bipolar disorder, schizophrenia [11]. Our results show that the heterozygosity (G/A genotype) for this locus is slightly overrepresented in patients with unfavorable PC prognosis. In contrast, the homozygosity at the locus and, especially, the presence of the G/G genotype seemed to be weakly associated with a better prognosis of the disease. At the same time, PC prognosis did not depend on the presence of the genotypes defining either normal or reduced COMT activity.

#### **MAOA gene**

The *MAOA* gene encoding monoamine oxidase A (MAOA) is located on the short arm of the X chromosome contains a VNTR of 30bp with 2, 3, 3.5, 4, or 5 repeated copies. The most common variants are alleles with three and four repeats, the latter one being responsible for a higher activity of the enzyme. Conversely, the presence of the allele with three repeats leads to a decrease in *MAOA* activity resulting in an increased serotonin level in the synapses, which was reported to increase the risk of aggression and antisocial behavior [12].

The results of *MAOA* genotyping show that only variants with 3 or 4 repeats (3R or 4R) could be detected in the investigated groups of patients. In patients with an unfavorable PC prognosis, the 3R variant tended to be slightly more common (OR = 1.582), however the difference between the groups failed to reach statistical significance.

#### **DRD4 gene**

The dopamine receptor gene *DRD4* is being intensively studied with regard to its possible involvement in several mental disorders, such as attention deficit disorder, gambling addiction, alcoholism, drug addiction, and schizophrenia [13]. The sequence of this gene contains a variable number of 48 bp tandem repeats (VNTR) in the third exon, ranging from 2 to 11 repeats (2R to 11R). The 4R allele is the most common in many populations, while the frequencies of the 2R and 7R alleles vary widely. Test results for this polymorphism demonstrates that the presence of homozygosity at this VNTR locus, especially the 2R/2R genotype (OR = 0.218) appear to be associated with a better prognosis, whereas the heterozygosity tends to be overrepresented in PC patients with a poorer prognosis (OR = 2.333).

The -521 C/T polymorphism in the promoter region of the *DRD4* gene influences its transcription level (decreased by 40% in T/T homozygotes), and the presence of the C allele has been previously shown to be associated with schizophrenia development risk, whereas the T allele was found to predispose to heroin addiction [14]. The results show trend for the presence of the C allele at the locus to be associated with a more favorable PC prognosis.

### Discussion

The study showed that polymorphisms of neurotransmitter metabolism genes responsible for predisposition to neuropsychiatric disorders have a different distribution in groups of patients with prostate cancer with high and low tumor growth rates.

The results of testing the *Stin2* polymorphism of the serotonin transporter gene were, in our opinion, the most paradoxical and interesting. It is known, and this is the subject of several meta-reviews, that in patients with schizophrenia, oncological diseases, and, in particular, prostate cancer are significantly less common [13]. We found that the homozygous genotype 12/12, associated with a tendency to schizophrenia, is more common in patients with prostate cancer with slow-growing tumors, and the heterozygous genotype 10/12, which is protective for schizophrenia, prevailed in patients with rapidly growing tumors. We do not have yet an explanation of the mechanisms of this phenomenon, but the revealed patterns allow us to think about the vector of further research.

According to the Val158Met polymorphism of the *COMT* gene, it has been discovered that the unfavorable Met allele, associated with a worse response to stress and a predisposition to a number of neuropsychiatric disorders [15], occurs more often (OR=1.189) at a high tumor growth rate.

According to the polymorphism in the promoter region of the *MAOA* gene, it has been observed that the unfavorable three-repeated allele associated with aggressive and antisocial behavior is also more characteristic of patients with rapidly growing neoplasms (OR=1.582).

And, finally, the study of two polymorphisms of the *DRD4* gene showed that

they are not only involved in the pathogenesis of neuropsychiatric disorders, but are also associated in a certain way with the rate of tumor growth in patients with prostate cancer.

According to the literature, in the study of VNTR *DRD4* polymorphism, patients with a higher number of repetitions showed a tendency to depression and other mental disorders [13]. Among our patients, genotype 2/2 with the fewest repeats can be considered protective against the development of PC (OR=0.220). Separate genotypes with a greater number of repeats (2/4, 3/3, 4/5, 4/6), on the contrary, were more common in patients with rapidly growing neoplasms.

A similar pattern was observed for the -521 C/T polymorphism of the *DRD4* gene - the T/T genotype, predisposing to mental disorders, such as heroin addiction, was more frequent in patients with tumors with a high growth rate (OR=1.579).

Since any oncological disease is multifactorial, and its main causes lie in the field of cell biology, the genetic indicators of differences in the regulation of neurotransmitter metabolism between groups of patients with high and low tumor growth rates that we have identified, which manifest themselves at the level of trends, are an addition to the main factors of the etiology of oncological disease and lie in the field of nervous regulation of biological processes.

However, personal and characterological features, associated neuropsychiatric disorders, as well as hereditary predisposition to them, can influence the development of a malignant neoplasm. A psychological examination of patients with prostate cancer with high and low tumor growth rates showed that patients with rapidly growing tumors often lack life goals or have a negative attitude towards the possibilities of their realization, which indicates a tendency to depression. The most characteristic personality traits of patients with a high rate of PC growth were compliance, gullibility, accountability and neglect of their own needs for the benefit of another, i.e., from the point of view of temperament - a certain passivity and melancholy. The characteristic patterns of behavior of these patients in the system of interpersonal interaction are also the inability to refuse and the manifestation of aggression, including constructive.

Thus, after this pilot study, we hope that further steps in this direction will allow us to determine ways to improve the effectiveness of the treatment of cancer patients, taking into account the genetics of their psychological status and personality characteristics.

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科学出版物

上合组织国家的科学研究：协同和一体化

国际科学大会的材料

2022年5月25日，中国北京

编辑A. A. Siliverstova

校正A. I. 尼古拉耶夫

2022年5月28日，中国北京

USL。沸点：98.7。 订单253. 流通500份。

在编辑和出版中心印制

无限出版社



