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

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中国“双循环”经济战略的新内容
NEW CONTENT OF CHINA “DUAL CIRCULATION” ECONOMIC STRATEGY

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摘要。在经历了2008年和2020年的危机后，中国经济在外部挑战面前表现出了高度的不稳定性。本文展示了新冠疫情期间经济封锁的负面后果。列举了疫情后国家对中国经济主体的支持措施。

介绍了影响中国从出口导向型经济发展模式向新经济战略转变的因素。揭示了“双循环”战略的概念，并简要描述了该战略，该战略既基于激活国内消费，也基于扩大与其他国家之间的对外贸易关系，同时坚持“开放经济”战略。

值得注意的是，中华人民共和国的“十四五”规划旨在发展高科技生产、创造和实施创新技术以及关键工业部门的数字化转型。强调中国希望扩大国内需求以满足人民的需求并实现最大程度的经济自给自足。

关键词：“双循环”模式，经济战略，国内需求，开放型经济，进口依存度。

Abstract. *Having faced the crises of 2008 and 2020, the Chinese economy has demonstrated a high degree of instability in the face of external challenges. The article shows the negative consequences of the economic lockdown during the COVID-19 pandemic. The measures of state support for economic agents in China in the post-pandemic period are listed.*

The factors that influenced China’s transition from an export-oriented economic development model to a new economic strategy are shown. The concept is disclosed and a brief description is given of the strategy of “dual circulation”, based on both the activation of domestic consumption and the expansion of foreign trade relations with other countries, maintaining commitment to the strategy of “open economy”.

It is noted that the 14th Five-Year Plan of the People’s Republic of China is aimed at the development of high-tech production, the creation and implementation of innovative technologies, and the digital transformation of key industrial sectors. Emphasis is placed on China’s desire to expand domestic demand to meet the needs of the population and achieve maximum economic self-sufficiency.

Keywords: *“dual circulation” model, economic strategy, domestic demand, open economy, import dependence.*

The negative socio-economic consequences of the coronavirus pandemic and strict lockdown, such as reduced profits of industrial enterprises, a drop in GDP, an increase in the consumer price index, a decrease in retail sales, a decrease in foreign trade turnover, especially exports, and others, forced the Chinese government to take supportive fiscal and monetary measures for enterprises and the population [1].

For example, in 2020, the amount of VAT refunds for almost 2 thousand export items was increased for exporting companies; to stimulate exports, the value of the national currency, the Chinese yuan, was also reduced; the most affected sectors of the national economy, such as logistics, medicine, education, and catering, were exempted from VAT.

The ensuing trade tensions with other countries, especially the United States, led, as A. Abdulkhaev notes, to "tariff disputes and uncertainty in world trade. These tensions affected China's exports and influenced the overall economic situation" [2].

Chinese technology companies (Huawei, etc.) have found themselves under attack from American economic repression as a result of the trade war with the United States, which has led to a reduction in the export market for China and pushed the country towards independence in key technologies, in particular, the production of semiconductors.

As L. Gamza and E. Zaklyazminskaya point out, China spent about 6% of the country's GDP on a package of measures to stimulate the economy, with support provided exclusively to economic agents [3].

Nevertheless, China's anti-crisis measures were insufficient to maintain the stability of the national economy; a "fulcrum" was needed to maintain high rates of economic development and increase the country's resilience to external economic shocks.

In May 2020 Xi Jinping said that it was necessary to "use the advantages of China's huge domestic market and the potential of its domestic demand to establish new development formats - domestic and international dual circulation that would complement each other" [4].

So, domestic trade turnover (domestic demand) was chosen as a "fulcrum", intended to "accelerate the creation of a full-fledged domestic consumption system and actively stimulate innovation in science, technology and other areas" [4].

Thus, it was recognized that the one-sided "going outward" strategy, which previously ensured the accelerated development of the Chinese economy, had exhausted itself, and the time had come for radical reforms.

Since over the past three decades, China's economic strategy has been strictly focused on exports and conquering certain niches in the international market, it may seem that the choice of a model based on activating domestic demand is a completely new Chinese economic strategy.

However, the term "international circulation" was introduced back in 1988, when Chinese scholar Wang Jian described China's export-oriented model of economic growth, which allowed the state to take advantage of cheap labor in global production chains [5].

Later, during the global financial crisis of 2008, when China's export-oriented model showed its fragility and high degree of instability under the influence of external unpredictable factors, the country began to develop new models of economic development, one of which was later called the "domestic circulation" model.

Nevertheless, it can be said that it was after Xi Jinping's speech in 2020 the term "dual circulation" acquired a specific semantic content and thereby attracted the attention of the international community.

A number of analysts assess the abandonment of the export-oriented model and the transition to prioritizing the development of the domestic market as a strategic shift in the Chinese economy. The "dual circulation" strategy (*dual cycle, dual circulation - English,* 双循环 *shuāngxúnhuán - Chinese (abbreviated from* 国内国际大循环 *- "internal (domestic) and external (international) dual cycle"*), approved by the Standing Committee of the Politburo of the CPC Central Committee in 2020, is included in the country's development plan until 2025, moreover, it is the central issue of the 14th Five-Year Plan.

China has outlined its desire to create conditions that would allow the domestic and foreign markets to stimulate each other in the face of aggressive international competition and difficult access for Chinese companies to key sectors of the economies of a number of countries. This is facilitated by an increase in government spending on research and development of innovative technologies, the development of high-tech production, support for priority sectors of the economy, and an increase in investment in mining enterprises. China pays special attention to the development of breakthrough technological solutions, artificial intelligence, and digitalization of the economy. Innovations should improve the efficiency of the domestic market, promote the growth of domestic demand of the population, and China also plans to gain certain advantages in the global market in the context of a tough international conference.

At the same time, China continues to be a major player in the global market. Without renouncing the idea of "going outward", it continues to open its economy to international trade, using free trade agreements with developing and least developed countries, which allow for the reduction and / or elimination of customs duties. Thanks to this, China expands its export market, diversifies importers, increases its influence in different regions of the world and at the same time formally fulfills the obligations on tariff liberalization adopted upon joining the WTO. It can be assumed that China is seeking to create a new, alternative to the WTO, world trade architecture, isolated from the influence of the United States, but including an increasing number of countries, primarily from the Asian region.

In other words, China is by no means giving up active participation in the global economy; it continues to fight against protectionism on a global scale. At the same time, domestic demand is considered the main driving force of the country's economic growth; the state's efforts are aimed at expanding it, improving its own innovative capabilities, and moving away from excessive import dependence. In general, it can be said that the "dual circulation" strategy means China's transition to a new stage of economic development and the desire for maximum self-sufficiency of the country while maintaining openness to the outside world and creating a new world trade architecture.

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制裁是变革的催化剂：新经济条件下俄罗斯物流的未来
SANCTIONS AS A CATALYST FOR CHANGE: THE FUTURE OF RUSSIAN LOGISTICS IN NEW ECONOMIC CONDITIONS

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摘要。近年来，受对外经济政策的影响，包括实施经济制裁，俄罗斯的物流发生了重大变化。这些旨在限制相互贸易关系的措施要求俄罗斯企业适应新的经营条件。国际贸易日益复杂、地理路线不断变化以及进口替代的需要成为国内物流面临的重要挑战。在国内生产增加和新贸易关系发展的背景下，研究制裁对物流过程的影响变得十分重要。本文探讨了俄罗斯物流系统转型的关键方向，并概述了新经济现实下物流业的发展前景。

关键词：制裁、物流、经济条件、进口替代政策、物流流程重新定位、物流流程数字化和自动化。

Abstract. *In recent years, logistics in Russia has been undergoing significant changes under the influence of foreign economic policy, including the imposed economic sanctions. These measures aimed at limiting mutual trade relations require Russian companies to adapt to new operating conditions. The increasing complexity of international trade, changing geographical routes and the need for import substitution are becoming important challenges faced by domestic logistics. In the context of increasing domestic production and the development of new trade relations, it becomes relevant to study the impact of sanctions on logistics processes. The article examines the key directions of the transformation of the logistics system in Russia, as well as outlines the prospects for the development of the logistics industry in the new economic realities.*

Keywords*: sanctions, logistics, economic conditions, import substitution policy, reorientation of logistics flows, digitalization and automation of logistics processes.*

Introduction.

Global economic changes and geopolitical factors have a significant impact on the development of logistics, putting pressure on traditional supply chain models and supply chain management. Over the past few years, with the introduction of a number of sanctions, Russian logistics has faced a number of challenges that require a fundamental revision of current strategies and practices [1].

Sanctions imposed on several key sectors of the economy have affected the availability of imported goods and materials, changing the usual logistics routes and approaches to supply management. In response to these challenges, Russian companies began to pay more attention to the development of domestic production, the change of suppliers, as well as the search for new markets for the sale of their products.

The relevance of this article is determined by the need to analyze changes in the logistics sector and understand its future development in an environment where the external economic environment remains unstable.

The purpose of the study is to identify key changes in Russian logistics in the context of new economic realities and assess the prospects for the development of the logistics industry.

It is worth saying that sanctions can manifest themselves in various forms: from trade restrictions and export bans to financial restrictions and blocking access to international markets [2]. These measures are applied by States or international organizations in order to exert pressure on certain countries or their institutions. For example, after the imposition of sanctions against Russia, in response to the events in Ukraine, many enterprises faced the need to review supplies and logistics chains.

One of the first and most noticeable effects of the sanctions was the change in traditional logistics routes. Companies are forced to look for alternative ways to deliver goods due to the closure of borders or restrictions on access to certain ports and transport hubs. In particular, there is a growing interest in alternative routes such as the Northern Sea Routes, as well as the use of new logistics centers in countries that do not support sanctions. [3].

But, as practice shows, sanctions have not only disadvantages. Thus, sanctions can contribute to the diversification of supply sources. Companies are starting to actively look for new suppliers in other countries, which leads to a change in the geographical structure of trade. This reduces the risks associated with dependence on one country or region, as well as increases the sustainability of business models. [4].

It is worth noting that in practice, the transformation of logistics flows is often associated with increased costs. Alternative routes may be less efficient in terms of delivery time and cost, which forces companies to review their budgets and opti-

mize processes. In addition, increased insurance costs and the need to store goods in alternative locations may also have a negative impact on financial performance. This forces transport companies to develop and actively implement innovative technologies in logistics. This may include automating processes, using digital technologies to track cargo and optimize routes, as well as developing new logistics strategies. Such changes make it possible to improve the effectiveness and reduce the negative effects of sanctions [5].

Materials and methods

As part of the study, the main regulatory legal acts related to the imposed sanctions and relevant measures aimed at protecting the economy were studied. The data of the Federal State Statistics Service on foreign economic activity were also examined and a review of scientific articles on the impact of sanctions on the economy, as well as on logistics and transport systems was conducted. Such research methods were applied as: substantive analysis (allowed to identify key topics and trends affecting logistics processes), statistical analysis (allowed to assess changes in the volume of cargo transportation) and comparative analysis (allowed to compare data on the state of logistics systems in Russia before and after the imposition of sanctions).

Results and its discussion

It cannot be denied that in the context of global changes caused by economic sanctions and other challenges, Russian logistics is undergoing significant transformations [6]. According to the authors, the main key trends that will determine the development of the logistics sector in Russia in 2025 are: import substitution; reorientation of logistics flows to the East; digitalization and automation of logistics processes. Let's look at these directions in more detail.

Firstly, taking into account the imposed sanctions and restrictions on supplies from Western countries, Russian logistics is actively developing an import substitution policy [7].

Import substitution is a strategy aimed at replacing imported products with domestic analogues. In Russia, this policy has been actively developing since 2014, when, after the introduction of economic sanctions, there was a significant shortage of goods and components in such strategically important industries as energy and defense. However, talks about import substitution in the Russian government began in the early 2000s, when support programs for large state corporations were launched. Currently, import substitution covers many industries, and its successful implementation requires an integrated approach, including both government support and business initiatives [8].

The Russian government sets itself several strategic goals within the framework of the import substitution program:

– reducing dependence on imports (the less dependence on foreign supplies, the more stable the economy will be in the face of external shocks;

- development of innovative technologies (creation of competitive enterprises capable of developing and implementing new technologies);
- increasing the share of local production (stimulating the growth of the domestic market and developing products that meet the needs of consumers);
- job creation (the development of domestic production contributes to the improvement of the social situation in the country and the creation of new jobs);
- resilience to economic crises (ensuring stability in the event of a change in the external economic situation).

It is worth noting that the import substitution program, which has been in force since 2014, has been finalized and adapted to new realities. In 2022, it became known about 1,500 launched projects aimed at the development of various sectors of the economy, including the production of high-tech equipment and protective goods [9]. Despite successes in some areas, such as agriculture (where Russia has achieved self-sufficiency in a number of products), it is difficult to organize import substitution in such strategically important areas as pharmaceuticals, high-tech engineering and IT.

The Import Substitution Service, created by the Ministry of Finance of Russia, has introduced a platform that facilitates interaction between manufacturers and buyers [10].

This "exchange" offers domestic goods and services without excessive bureaucracy, which significantly stimulates Russian companies. These changes have allowed many businesses that previously depended on imports to enter the market with their products.

Steps taken by the state in the context of sanctions:

1. Legislative initiatives. In the context of the crisis, the state began to adopt various laws aimed at supporting domestic production. The key points are the requirements for the purchase of goods produced in Russia for government orders, as well as the priority of using domestic software in public procurement.
2. Stimulating domestic production. The new laws have established obligations for companies to purchase a certain amount of Russian goods and services, which should help develop domestic production and reduce dependence on imports.
3. Support for small and medium-sized enterprises. The import substitution program also includes measures to support small and medium-sized businesses, which expands opportunities for innovative startups and small companies.

Import substitution in Russia is a complex and multifaceted process that requires an integrated approach and interaction between various sectors of the econ-

omy. In the conditions of modern realities, import substitution is becoming not only an economic necessity, but also an important factor for ensuring national security. Therefore, it is important to continue to develop legislation and programs that contribute to the effective implementation of the import substitution strategy.

The second key trend in the development of the logistics sector in Russia in 2025 is the reorientation of logistics flows to the East [11]. In the context of global changes, Russian companies have significant prospects for expanding cooperation with new strategic partners, especially in Asia, the Middle East and Africa, which is confirmed by official statistics [12].

Table 1

Dynamics of Russia's trade turnover for 2018-2023, billion US dollars

Year	Trade turnover, billion US dollars	Exports, billion US dollars	Imports, billion US dollars
2018	688,1	449,5	238,4
2019	672	424,6	247,3
2020	572,6	338,6	234
2021	789,4	493,3	296,1
2022	847,8	592,5	255,3
2023	710,1	425,1	285,1

As can be seen from the data shown in the table, in 2018, the trade turnover amounted to 688.1 billion US dollars. This was one of the highest indicators achieved after the economic crisis of 2014. In 2020, due to the COVID-19 pandemic and related economic consequences, trade turnover decreased to about 572.6 billion US dollars. However, the economic recovery has led to an increase in trade turnover to 789.4 billion US dollars in 2021, due to rising oil and gas prices, as well as a recovery in demand. In 2022, in the context of increased international sanctions after the outbreak of hostilities in Ukraine, trade turnover first sharply decreased, and then showed an increase to 847.8 billion US dollars. However, imports decreased significantly, while exports, on the contrary, significantly increased the indicators. In 2023, the situation remains stable, indicating a trade turnover of 710.1 billion US dollars and with a forecast for further growth due to a shift in emphasis to countries that have not joined the sanctions against Russia, such as China, India and the countries of the Commonwealth of Independent States.

The need to expand cooperation with new strategic partners is justified by a number of factors:

1. The geopolitical situation:

– the conditions that have arisen after the imposition of sanctions against Russia are pushing the country to search for new trade routes and partners;

– simplification and strengthening of relations with East Asia, including China, India and Southeast Asian countries, open up new opportunities for mutually beneficial cooperation.

2. Infrastructure development:

– the Russian Government is actively investing in the development of transport infrastructure, including the Trans-Siberian Railway and the highway network, which contributes to the active movement of goods to the East;
– port modernization projects such as Vladivostok and Novorossiysk also enhance the opportunities for transshipment and flow of goods from west to east.

3. Changing logistics routes:

– with new trade agreements and initiatives such as “One Belt, One Road”, Russian companies can benefit from shorter and more efficient routes for the delivery of goods;
– the development of multimodal transportation, including a combination of rail and sea transport, is becoming the basis for convenient and fast logistics.

Third, digitalization and automation of processes are seen as a trend in the development of Russian logistics. Digitalization and automation play a key role in optimizing logistics operations and processes and increasing their efficiency. The main directions include:

– implementation of software for supply chain management (management systems that allow the integration of data on goods, stocks and routes);
– the use of blockchain technologies (to ensure transparency and reliability of transactions between participants in the logistics chain);
– development of automation platforms (simplification of ordering processes, cargo tracking and warehouse management through online platforms);
– self-driving vehicles (the introduction of autonomous trucks and drones for the delivery of goods);
– robotization of warehouse processes (using robots for picking and sorting goods in warehouses);
– smart management systems (using artificial intelligence to predict demand and evaluate the effectiveness of logistics chains).

Conclusion.

Summing up, it is worth noting that the transformation of logistics flows under the influence of sanctions is a complex and multidimensional process. Companies are facing new challenges related to changing supply routes, increasing costs and the need to find new partners. At the same time, sanctions can be a catalyst for innovation and increased flexibility of business models. An important step forward will be the development of strategies based on the analysis of recent trends,

which will allow businesses to adapt to changing economic conditions and ensure sustainable development in an uncertain environment.

According to the authors, the development of logistics in Russia in 2025 will be characterized by an emphasis on import substitution, reorientation to eastern markets, active digitalization and automation of processes. These trends will help Russian companies adapt to new economic conditions and improve the quality of their services in the face of global changes.

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明确和扩展企业战略管理系统的要素
CLARIFYING AND EXPANDING THE ELEMENTS OF THE STRATEGIC MANAGEMENT SYSTEM IN ENTERPRISES

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摘要。该报告借鉴了俄罗斯和国际专家对科学文献和实践研究的分析，提出了在当代条件下对战略管理概念进行重大扩展的建议。这一扩展将战略管理视为集成管理技术系统 (IMTS) 的共生体，该系统涵盖企业业务流程 (BP) 的设计和监管、平衡指标系统 (BSC) 和关键绩效指标 (KPI)。该报告探讨了这些概念及其相互作用的深入和概念发展，重点是如何应用这种方法在企业内部形成全面的战略管理系统。

关键词：战略管理、集成管理技术系统 (IMTS)、业务流程 (BP)、平衡指标系统 (BSC)、关键绩效指标 (KPI)、滑动战略管理 (SSM)。

Abstract. *The report, drawing on an analysis of scientific literature and practical research by both Russian and international specialists, proposes a significant expansion of the concept of strategic management in contemporary conditions. This expansion views strategic management as a symbiosis of an integrated managerial technology system (IMTS), which encompasses the design and regulation of the enterprise's business processes (BP), a balanced system of indicators (BSC), and key performance indicators (KPI). The report explores the intensive and conceptual development of these concepts and their interaction, focusing on how this approach can be applied to form a comprehensive strategic management system within the enterprise.*

Keywords: *Strategic Management, Integrated Managerial Technology System (IMTS), Business Processes (BP), Balanced System of Indicators (BSC), Key Performance Indicators (KPI), Sliding Strategic Management (SSM).*

One effective mechanism for linking and monitoring the achievement of strategic and tactical goals within an enterprise, utilizing the principles and methods of strategic management, is the Balanced Scorecard (BSC). The BSC allows enterprises to align their strategic planning, annual budgeting, and business process development across four key perspectives: production and finance, customers (marketing), business processes, and development. The greatest impact of combining strategic management methods with the BSC is achieved through the creation of an integrated set of performance indicators that translate the enterprise's mission and strategy into a system of strategic goals, metrics for their achievement, and the factors that influence their formation and change. Prominent research in this area includes the work of D. Jeston, R.S. Kaplan, D.P. Norton, B. Phelps, and other scholars [6, 9, 15].

Additionally, the business management strategy for an average or large diversified enterprise, focused on achieving multidimensional goals and objectives, is typically implemented using Key Performance Indicators (KPI). KPIs are developed both for the enterprise as a whole and for its individual units, particularly for centers of financial responsibility (CFR). The KPI system generally adopts a hierarchical, dendritic structure and, as a rule, aligns with the financial structure employed in the enterprise's budgeting system [2, 14].

In this context, the authors of this article recommend viewing strategic management as a symbiosis, a triad consisting of: an Integrated Management Technology System (IMTS), a Balanced Scorecard (BSC), and Key Performance Indicators (KPIs). This integrated approach serves as the foundation for forming and implementing strategic management frameworks [6, p. 16].

The advantages of this approach to strategic management lie in the fact that the Integrated Management Technology System (IMTS) becomes the foundation of the enterprise, oriented towards the development and implementation of a market-driven philosophy focused on achieving «global quality» to meet consumer demands. The Balanced Scorecard (BSC) introduces a systematic approach to tracking indicators that reflect the degree of goal achievement and business efficiency within the enterprise, while Key Performance Indicators (KPIs) further break these down into financial and operational metrics, serving as targeted guides for business processes. These target indicators – both cost and natural indexes (along with KPI metrics)—help establish a hierarchical structure for the enterprise's goals, ranging from strategic objectives to tactical goals, and from tactical to operational targets.

At the same time, the planning period (e.g., month, quarter, year), the level of consolidation, and the specific composition of indicators must be considered, along with parameters for control and comparison with targeted benchmarks. Thus, the indicators form a «system» only when clear and implicit connections are

established among them. The list of indicators transitions into a full-fledged BSC when institutional conditions, norms, and the pace of their dynamics – balanced across time and space—are defined. For instance, financial indicators may be balanced at the level of a master budget or within specific sections of the enterprise's balance sheet, such as assets and liabilities.

It is important to note that simultaneously with the formation of a system of indicators, that is, the «transformation» of indicators into a «system» within the framework of the concept of strategic management of the enterprise, the indicators themselves reflect not only the philosophy and methodology adapted to the features of the construction of such a system, but also emphasize their use in business – processes of the enterprise [10]. In other words, these indicators unite the entire enterprise management system, acting as elements of the process approach [3, 8, 18].

From the perspective of enterprise management, the authors identify several key business processes as essential: planning (including budgeting and the budgeting process), accounting for actual data in budgets, plan-versus-fact analysis, operational analytical data processing (including real-time analysis and multidimensional data analysis through OLAP), and the decision-making process. These business processes are defined within the strategic management framework, with the understanding that they are carried out only within the relevant responsibility centers (e.g., the CFO), the regulations of which, concerning budgeting, are aligned with the enterprise's goals and objectives.

In general, it can be concluded that the Balanced Scorecard (BSC), as a system that governs the regulations of business processes, complements budgeting, which in this context serves as a tool for analyzing the indicators of these processes. All operations within business processes, under this approach, must be pre-agreed upon in terms of resources, technology, time, and outcomes. Only under such conditions can the enterprise effectively plan and manage its entire business cycle [4, 8].

Despite several decades since the emergence and widespread adoption of modern strategic management concepts, it must be acknowledged that in Russian economic practice – across industries, the financial sector, budgetary organizations, and even in small and medium-sized businesses – the principles of strategic management in their «classical» form have unfortunately not been successfully implemented. It is unlikely that even a dozen or two enterprises or organizations can be found where a fully developed, established, and functioning strategic management system is in place.

Certainly, these enterprises may have individual fragments, blocks, or components of the strategic management system that function effectively, yielding positive results and demonstrating the potential of strategic management and its

various elements. In this context, a process-oriented approach to business helps establish clear connections between actions aimed at producing products or services and meeting customer needs, as well as the costs involved in their execution [7, 13]. It is also important to note that in developing a «comprehensive budget system» for the enterprise, it is advisable to present costs in different forms, aspects, and relationships, utilizing various classifications [11, p 15-16]. Therefore, in implementing this concept, it is beneficial to apply traditional classifications that have proven effective and were developed during the evolution of budgeting, Balanced Scorecard (BSC), and Key Performance Indicators (KPIs). These established frameworks provide a reliable basis for structuring and analyzing the financial components of the enterprise's strategic management system [5, 16-17].

Why does this situation occur, and what are the underlying causes? The authors identify several key reasons.

Firstly, many companies that have declared their intention to establish a strategic management system not only lack professional management specialists but also struggle to find individuals who truly understand its goals and objectives. The experts brought in to help are typically temporary consultants who focus on setting up the system, which is often viewed by employees and managers as foreign and unnecessary. This perception fosters resistance to change, as the innovations remain unclear and unfamiliar—an issue that has been extensively discussed in both international and domestic management literature. This problem extends beyond cognitive barriers to include psychological and emotional factors, which significantly influence the successful implementation of strategic initiatives.

Secondly, as a direct consequence of the first factor, there is often a lack of dedicated teams within enterprises that could serve as «drivers» for the development of the strategic management system – motivated individuals who are proactive and results-oriented. The high mobility of skilled professionals and the intense competition for intellectual capital further limit the enterprise management's ability to invest in training and developing employees, thereby hindering efforts to enhance both their general and specialized professional capabilities.

Thirdly, it is regrettable, but many managers remain accustomed to decision-making based on «intuition», personal experience, prior knowledge, and traditional institutional relationships. While these relationships, despite being largely outdated, are still perceived as adequate for addressing contemporary challenges, they are no longer the decisive factor for success. Although they remain important, their relevance has diminished. Meanwhile, younger managers and specialists either consciously avoid such roles due to career, psychological, or economic considerations, or lack the necessary knowledge and skills to effectively perform them.

Fourthly (and by no means least), the development of a «new» system and the replacement of the «old» one necessitate substantial material, financial, time,

and other resources. Furthermore, such a system requires ongoing support, monitoring, maintenance, continuous development, and potentially upgrades after a certain period, resulting in additional and recurring costs. Simultaneously, the outcomes of these efforts are not guaranteed, and the associated risks are typically not assessed due to the absence of appropriate methodologies. Enterprise management is unlikely to willingly embrace even «traditional» risks, particularly in the context of digitalization of business processes, which is often perceived differently by both managers and specialists, as well as the incorporation of elements of artificial intelligence.

Thus, «managerial sabotage» and the identification of negative aspects within the strategic management system are not uncommon occurrences in practice. The partial improvements implemented in such instances tend to be more accessible, cost-effective, and comprehensible to management. However, these modifications fail to address the problem comprehensively. While they may yield some incremental gains – whether competitive, financial, or technological – they do not facilitate a transformative or «revolutionary» solution that could elevate the organization to a new level of operational and technological advancement. Frequently, within the scope of these efforts, changes that are either unrelated or only weakly connected to strategic management are presented as strategic improvements. This diminishes their overall effectiveness and diminishes the appeal of strategic management. In such circumstances, it is unrealistic to anticipate the synergistic benefits that a properly implemented strategic management system could offer.

From the authors' perspective, a contradiction emerges between the liberal (or pseudo-liberal) economic model and the rigid administrative model of economic and enterprise management. The authors contend that strategic management can be implemented more effectively and with fewer challenges for employees when enterprises, organizations, production facilities, and complexes are subject to significant state regulation. Illustrative examples of such entities include military-industrial complex (MIC) enterprises, state-run organizations, and, to some extent, sectors such as education, healthcare, and others.

In other words, in such contexts, rather than relying on forecasts, foresight, long-term programs, evaluations, or analogues of «indicative planning», the (often overlooked) concept of a «plan» and/or «control figures» is employed. These tools do not imply irresponsibility or leniency (as in the principle: «the higher the level, the lower the responsibility»), but rather emphasize the specific, accountable responsibility of designated individuals (with full identification). According to the authors, this approach does not preclude the use of «Sliding» Strategic Management (SSM) technologies [see 1, 18-20] within enterprise management, as these technologies establish a framework that facilitates the continuous reassessment of the current situation in real time [12, 20].

Building on the points above, the following substantive addition to the concept of strategic management can be proposed. This addition asserts that strategic management within an enterprise is facilitated by Integrated Strategic Management Systems (IMTS) within the framework of Balanced Scorecard Indicators (BSC). These indicators are further refined through the specific objects in which the core business processes of the enterprise (BPs) are executed, and are measured through Key Performance Indicators (KPIs).

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针对家庭和未成年人的犯罪
CRIMES AGAINST THE FAMILY AND MINORS

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摘要。在本文中，作者将研究吉尔吉斯共和国针对家庭和未成年人犯罪的数量和质量方面。分析了此类犯罪发展的主要趋势，以及它们在吉尔吉斯斯坦行政区划中的分布情况。尽管此类犯罪的报告案件数量有所减少，但其潜伏期却有所增加。这是在社会经济领域缺乏积极变化的背景下发生的，而积极变化可以有助于实际减少此类犯罪的数量。

关键词：未成年人、反社会行为、犯罪、参与、家庭。

Abstract. *In this article, the authors will examine both quantitative and qualitative aspects of crimes committed against families and minors in the Kyrgyz Republic. The main trends in the development of this type of crime are analyzed, as well as their distribution to the administrative-territorial units of Kyrgyzstan. Although the number of reported cases of these crimes decreased by, the growth observed in their latency. This happens against the background of the absence of positive changes in the socio-economic sphere, which can contribute to the real reduction in the number of such crimes.*

Keywords: *minors, antisocial behavior, crime, involvement, family.*

Ensuring the well-being of families and minors is the main function of the state and all its social institutions. The Constitution of the Kyrgyz Republic establishes that motherhood and childhood, the family are under the protection of the state.

One of the means of such protection is the criminal-legal protection of the family, the interests of the minor, the conditions for the normal physical, intellectual and moral development of his personality.

According to the Constitution of the Kyrgyz Republic, the care of children and their upbringing are equal rights and responsibilities of parents. Parents are responsible for the development and upbringing of their children. The law also states that «when exercising parental rights, parents do not have the right to harm the physical and mental health of children, as well as their moral development.» Methods of education must exclude neglectful, cruel, rude and derogatory treatment, insults or exploitation of children.

The family is a natural and fundamental unit of society, which has the right to protection from both society and the state. This statement is enshrined in the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights. The International Covenant emphasizes that every child, regardless of race, color, sex, language, religion, nationality, social status, property or place of birth, has the right to the protection due to his status as a minor on the part of his family, society and the State.

The Declaration of the Rights of the Child, adopted on November 20, 1959, affirms the important principle that the child must enjoy special protection by law and other means, and must be provided with conditions and opportunities conducive to his physical, mental, moral, spiritual and social development in a healthy and normal environment, while guaranteeing freedom and respect for his dignity.

Crimes against the family and minors pose a significant danger not only to individual victims, but also to society as a whole. The family plays a key role in the process of socialization, and any criminal acts that threaten its integrity cause harm not only to those directly affected, but also to future generations.

N.I. Vetrov believes that, “The common feature of all crimes, the norms of which are combined, is the generic object - social relations that provide both material and non-material conditions for the normal physical, intellectual and moral education of minors, the proper functioning of the family, the existence of disabled children and disabled parents.”

[1. C-134]

Among the offenses committed by young people, a significant portion are serious crimes related to greed and violence. Often, such acts also have elements of vandalism and display excessive cruelty. Many of these crimes occur with complicity, most often in the form of joint execution, which corresponds to the peculiarities of adolescent psychology. Approximately every third crime is committed by them in the company of adults. In addition, the immediate object may be certain social relations concerning the provision (development) of the personality of a minor or the normal existence of disabled parents and adult children. Thus,

depending on the immediate object as a classification criterion, these crimes can be divided into two categories:

1. against minors;

2. against the family.

- Only a person under the age of eighteen is considered a victim of this crime. Actions aimed at involving the victim in antisocial behavior may include promises, deception, threats or other methods. The law classifies the following types of antisocial behavior: regular consumption of alcoholic beverages, drugs by minors, vagrancy, prostitution, and so on.

- According to the Family Code of the Kyrgyz Republic, parents are obliged to provide for their minor children, as well as adult children who cannot work and need support. The law also imposes on able-bodied adult children the responsibility for the maintenance of their disabled parents who need help, and care for them. It is important to note that the direct object of this offense is the material living conditions of minor disabled persons who are children or other family members (son, daughter) in relation to the perpetrators. As V.E. Eminov notes: "A special feature of juvenile delinquency is that the crimes are committed by individuals who, primarily due to their age, are exposed to numerous risks that may lead to them committing a crime or having a crime committed against them." [2. C-336]

Youth crime is characterized by high dynamics and activity of adolescents. Individuals who begin to commit crimes at an early age are often difficult to correct and re-educate, and, as a rule, become a potential reserve for adult criminal activity. The following characteristics of juvenile delinquency are distinguished:

1. a significant proportion of offenses are committed against family members, relatives and acquaintances;

2. minors are also among the victims;

3. crimes occur in the apartments of acquaintances;

4. most offenses fall into the category of street crime, while they are mainly classified as hooliganism;

5. approximately half of the crimes are committed after 10 p.m.;

6. offenses occur in groups;

7. an adult with criminal experience is present in a criminal group of minors;

8. impudence and cynicism are observed when committing crimes;

9. illegal activity is of a long-term nature;

10. unjustified cruelty is displayed when committing crimes.

The structure of crime among minors has its own characteristics: 1) a limited range of offenses committed; 2) a smaller proportion of serious crimes, where theft, robbery and hooliganism are most often encountered, while murder, serious bodily harm and robbery are much less common; 3) a small proportion of crimes committed through negligence.

Crimes committed against minors are serious threats to society, since they directly violate those social ties that guarantee the full physical, mental and moral development of young people. All family members always learn about the social consequences of a crime committed against a specific individual. These consequences for the family are always great and often irreversible (especially as a result of aggressive violent crimes). Material and moral damage from crimes is most often compensated by the efforts of the family. Therefore, we can agree with criminologists that the concept of a crime victim in the broadest sense is considered the most correct, including the victim's relatives. Any crime committed against an individual can simultaneously harm the interests of the family and minors. Therefore, when qualifying, it is necessary to distinguish crimes against the family and minors from crimes whose victims are family members, including minors. The ratio of these categories should be considered as a partial whole ratio. When defining the concept of crimes against the family and minors, it is important to correctly select the criterion that distinguishes the analyzed crimes from other acts.

In addition, crimes against minors, as provided for by the Criminal Code, consist of failure to fulfill parental responsibilities to raise children. The Family Law of the Kyrgyz Republic establishes the responsibility of parents to raise their children. This includes caring for their physical, mental, spiritual and moral development, as well as preparing them for socially useful work and raising them as worthy members of society. At the same time, the rights of parents should not contradict the interests of their children.

The reasons for crimes against the family and minors can be varied and include:

- Social aspects: poverty, lack of work, lack of educational opportunities;
- Psychological aspects: the presence of mental disorders in offenders, experience of violence in their own families;
- Cultural aspects: ingrained stereotypes about gender roles and social norms of behavior.

Thus, crimes against the family and minors continue to be an important problem that requires a comprehensive solution and joint action by society, the state and law enforcement agencies. Effective measures to prevent and combat such crimes can significantly improve the standard of living and safety in society.

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民事登记处离婚的特点
FEATURES OF DIVORCE IN CIVIL REGISTRY OFFICES

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摘要。家庭和婚姻关系终止这一主题的现实意义是毋庸置疑的，因为由于配偶不仅不想生活在一起，而且不考虑他们的未来，不考虑他们的老年生活，家庭破裂的做法正在世界各地发展。草率和不加思索地做出解除婚姻的决定不仅会给这个家庭带来严重问题，还会给社会带来严重问题。必须指出，破碎家庭的发展不仅直接影响俄罗斯的人口状况，也影响国外的人口状况。

本文作者阐述了他们对当前形势的看法，并建议通过建立专门的家庭危机中心来解决现有问题。

关键词：民事登记处、配偶、前配偶、民事身份行为、争吵、危机中心、离婚、人口状况、社会、家庭制度的破坏。

Abstract. *The relevance of the topic of termination of family and marital relations is beyond doubt, since the practice of family destruction is developing all over the world due to the fact that spouses not only do not want to live together, but also do not think about their future, do not think about their old age. Hastiness and thoughtlessness of making a decision to dissolve a marriage leads to serious problems not only in this family, but also in society. It must be said that the developing situation with broken families directly affects the demographic situation not only in Russia, but also abroad.*

The authors in the article define their vision of the current situation and propose to solve existing problems by creating specialized family crisis centers.

Keywords: *civil registry offices, spouses, former spouses, civil status acts, quarrels, crisis center, divorce, demographic situation, society, destruction of the institution of the family.*

Currently, the dissolution of marriage by both spouses in the registry office has increased significantly, since a man and a woman entering into a family-marital

relationship do not think about the seriousness of creating a family. A short period of living together leads to their bitterness, intolerance, and, consequently, the termination of the marriage.

It should be noted that for such spouses, the one-time impulse to register a marriage and the alleged desire to have a family ends with the first problems that a young family faces (for example, lack of funds, lack of housing, unwillingness to help each other, excessive employment at work, age difference, intervention of other family members with advice to these spouses) and the family has not yet had time to establish itself, has not passed this serious period, after which the period of divorce begins. It should be noted that spouses, as a rule, do not regret the loss of family values, but on the contrary, believe that they have acquired experience in both creating and terminating family-marital relations. Russian family legislation, like that of other foreign countries, does not contain any special rules that strictly stipulate the reasons and grounds for divorce.

M.V. Antokolskaya notes that «Russian law was one of the first in Europe to completely exclude guilt from the divorce process, but it was also the first in Europe to actually abandon the irreparable breakdown of the family as a basis for divorce and introduce the so-called divorce on demand» [1, P. 171].

In our opinion, the author is still in a hurry, attaching special importance to the dissolution of marriage on demand, since it is not always possible to establish the reason for the termination of the marital relationship of the spouses as a consequence of the irreparable breakdown of the family in the registry office. Due to the fact that today there is a huge number of dissolved marriages, and the state, in turn, sets the task for the registry office about the possible preservation of the family, the state family policy sets as its goal for society the preservation of families as much as possible, including even without children.

At the initial stage of creating a family, spouses had feelings, love, respect and they could not lose them in a short period of time, therefore, in our opinion, crisis centers should be created at the civil registry offices to organize conciliation procedures for such spouses. The crisis center, in our opinion, should be headed by a specialist in the field of family law, who, being married himself, has already raised children and is wise with life experience and can provide practical assistance in preserving the family. Thus, this specialist can have the status of a pre-trial mediator and regulate the relations of warring spouses with the help of a conciliation agreement, which must be approved by him and in such an agreement it is necessary to determine the further development of the family. In our opinion, even if 50% of spouses achieve reconciliation, this will be a significant step in preserving the family and fulfilling the goals and objectives of the state family policy.

It should be noted that in the civil registry office, the marriage of spouses is dissolved provided that they do not have common minor children (Article 19 of

the Family Code of the Russian Federation [2]), and in exceptional cases if they have common minor children (the spouse is recognized by the court as missing, convicted of committing a crime to imprisonment for a term of more than 3 years and recognized by the court as incompetent due to mental disorder). It should be said that not always both spouses agree to divorce, but there are also cases when one of them wants to save the family and does not appear at the civil registry office for divorce. The spouse who filed an application for divorce with the civil registry office insists and does not want to save the family, then in this case such spouses have the opportunity to apply to the court to terminate the marriage.

It should be said that not always both spouses agree to divorce, but there are also cases when one of them wants to save the family and does not appear at the registry office for divorce. The spouse who filed an application for divorce with the registry office insists and does not want to save the family, then in this case such spouses have the opportunity to apply to the courts to terminate the marital relationship.

It should be noted that the extrajudicial procedure for divorce is indisputable, since the registry office does not have the right to save the family, resolve conflict situations between spouses, but only has the legal right to terminate the marital relationship, and all conflicts related to the division of property are supposed to be resolved in court or on the basis of a written agreement of the spouses, which is certified by a notary.

Simplification of the divorce procedure is also allowed in cases where there are very good reasons to believe that in fact family relations do not exist for a number of reasons.

In accordance with paragraph 3 of Art. 19 Family Code of the Russian Federation, paragraph 3 of Article 34 of the Federal Law «On Civil Status Acts» [3] divorce is carried out after one month from the date of filing the application.

It should be said that the civil registry office bodies cannot shorten or extend the period set for spouses to consider their decision to terminate the marriage. Only if there are reasons preventing the spouses from appearing on the appointed day, and at their joint request, is it possible to postpone the deadline for filing a divorce. However, the law does not disclose even an approximate list of such valid reasons that prevent spouses from appearing on the appointed day at the civil registry office for divorce.

In our opinion, such reasons include a long stay in a hospital, a serious illness of close relatives or their death, etc.

The one-month period specified in the law is set for divorcing spouses to consider their decision, which, in our opinion, is insufficient and this period should be set within 2 months. All this will allow the conflicting spouses to reconsider their behavior, attitude towards each other and, possibly, save the family.

Thus, it is necessary to make an addition to paragraph 3 of Article 19 of the Family Code of the Russian Federation and specify that «the dissolution of marriage and the issuance of a certificate of divorce is carried out by the civil registry office after the expiration of the date of filing an application for divorce».

It should be noted that state registration of divorce is carried out by the civil registry office at the place of residence of the spouses (one of them) or at the place of state registration of marriage. In accordance with Article 333.26 of the Tax Code of the Russian Federation [4], the state fee paid upon registration of divorce, including the issuance of a certificate, with the mutual consent of the spouses who do not have common minor children, is 650 rubles from each of the spouses, but from 01.01.2025 the amount of the state fee increases to 5,000 rubles from each of the spouses.

In our opinion, this amount is too small, so it is proposed to increase it to 10,000 rubles from each of the spouses, and, consequently, this amount will replenish the federal budget, and spouses, among other things, will be more conscious not only about creating a family, but also about ending family and marital relations. It should be said that when terminating a subsequent marriage, the amount of the state fee should be 15,000 rubles, for the third terminated marriage 20,000 rubles, and all subsequent marriages upon their dissolution should be subject to a state fee of 30,000 rubles.

Table.

Comparative analysis of state registration of civil status acts in the Rostov region for the period 2015-2022 [5; 6]

Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Marriage	33 111	26 491	29 425	26 957	26 670	20 935	25 656	29 450
Divorce	18 414	18 117	18 289	17 741	18 136	16 744	18 218	20 135

Thus, it can be noted that, although the marriage rate is high, more than 50% of marriages end in divorce.

It seems that in order to solve the problems associated with the increase in the number of divorces in the Russian Federation, it would be possible to resolve the issue of excluding the administrative procedure for divorce at the legislative level and to enshrine in Article 18 of the Family Code of the Russian Federation that «the divorce of spouses who have or do not have common minor children must be carried out in court according to the rules of Articles 21-23 of this Code».

It should be said that by excluding the administrative procedure for divorce from the Family Code of the Russian Federation, entrusting the consideration of cases on the dissolution of marriage of spouses to the magistrates' courts, it is possible to reduce the number of divorce cases, and the court, in turn, is obliged to

establish the reasons for the divorce and give them a legal assessment. Thus, this provision will not only preserve the family as an institution, but also improve the microclimate in the family.

The simplified form of termination of marital legal relations, as we see, is increasing every year, and in order to stabilize the family as an institution of modern society, in our opinion, it is necessary to adopt the state program «Preservation and Strengthening of the Family», which should become an integral part of the state's social policy. To implement the state Program, it is necessary to allocate funds from the federal budget to stimulate and preserve the family.

For this, in our opinion, several subprograms should be adopted, namely «Anniversary milestone of cohabitation of spouses» when registering the marriage of the spouses, the registry office must track the terms of cohabitation of the spouses and reward them with valuable gifts every five years on behalf of the head of the subject of the Russian Federation.

The second subprogram should stimulate the birth and upbringing of children in the family, including adopted ones, and have the status of «Large family».

Thus, the above will allow not only to preserve existing families, but also to increase the number of newly created ones.

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外语教育中培养分析性思维的技术方法
TECHNOLOGICAL APPROACHES TO DEVELOPING ANALYTICAL THINKING IN FOREIGN LANGUAGE EDUCATION

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注释。本文探讨了全球化和现代教育框架下外语学习与批判性思维能力培养之间的复杂关系。它深入探讨了语言习得和批判性思维的结合如何产生协同效应，从而增强这两个过程。通过强调整体教学方法的重要性，包括基于问题的学习和同伴互动，该研究不仅强调语言能力的发展，还强调跨文化能力的发展。

关键词：外语学习、跨文化、交流、基于问题的学习、学生参与、交际能力。

Annotation. *This article examines the intricate relationship between foreign language learning and the cultivation of critical thinking skills within the framework of globalization and modern education. It delves into how the integration of language acquisition and critical thinking creates a synergistic effect that enhances both processes. By emphasizing the importance of a holistic pedagogical approach, including problem-based learning and peer interaction, the research highlights the development of not only linguistic competence but also intercultural competencies.*

Keywords: *foreign language learning, intercultural, communication, problem-based learning, student engagement, communicative competence.*

Globalization is blurring the lines between countries and cultures, opening up new avenues for language exchange. Learning a new language is increasingly important in our interconnected world, giving us access to a wealth of diverse and complex information. As E.K. Vdovina pointed out, critical thinking is crucial for language acquisition. Even beginner language learners enhance their analytical

skills by comparing their native language with the new one. This comparative process not only makes learning more engaging but also fosters cultural understanding.[8]

The internet's role in globalization has further amplified this by providing unparalleled access to information in numerous languages. Social networks, online seminars, and global initiatives create numerous opportunities for language practice and intercultural interaction.

Nevertheless, worldwide networking also presents certain challenges, such as the threat of language assimilation and the loss of cultural diversity. Developing critical thinking in the process of learning foreign languages not only develops language proficiency but also helps learners become more competent citizens of a global society. In today's interconnected world, critical thinking—the ability to analyze information, evaluate viewpoints, and make sound judgments—is essential for success. It not only sharpens our minds but also cultivates empathy and tolerance, promoting understanding in cross-cultural interactions. This is especially relevant in higher education, where English often serves as a common language, and critical thinking is key to navigating academic discussions and succeeding in the global job market. Like language acquisition, critical thinking isn't innate but develops through sustained study and practice. Interestingly, developing these two skills concurrently creates a mutually beneficial relationship, where progress in one reinforces the other [1]. Foreign language learning offers unique opportunities for the development of critical thinking. The primary goal of language education is to cultivate communicative competence, which serves as a powerful tool for fostering critical thinking. Conversely, the ability to think critically enhances effective communication. Thus, language learning and the development of critical thinking are closely intertwined and mutually reinforcing. This fosters a tolerant attitude towards the traditions and ethical norms of other cultures and cultivates the ability to communicate effectively with people from different societies, using both verbal and nonverbal language, thus contributing to the acquisition of sociocultural competence. Furthermore, exposure to foreign cultures through language study enables students to compare and contrast them with their own, stimulating the development of critical analysis skills in relation to sociocultural realities.

Critical thinking is not merely a body of knowledge but a complex set of skills that require constant practice. While it develops most effectively within specific subject areas such as mathematics, history, or literature, without regular practice these skills can atrophy. To prevent this, it is essential to systematically incorporate tasks designed to develop critical thinking into the curriculum. These tasks might involve analyzing information, comparing and contrasting, classifying, identifying cause-and-effect relationships, and evaluating arguments. It is crucial that these tasks are varied and allow students to apply their skills in a variety of

contexts. The teacher's role in this process is not only to provide tasks but also to create a learning environment that encourages students to think actively and express their own opinions. Regular practice and feedback from the teacher will help students monitor their progress and apply critical thinking skills more confidently in their daily lives.

Furthermore, the development of critical thinking is only possible when students are confronted with real-world problems and are required to make decisions in various situations. Integrating the development of critical thinking into foreign language instruction is an important pedagogical approach. This approach involves posing questions, justifying claims, formulating arguments, using reliable and relevant sources, considering situations holistically, and demonstrating a propensity to apply critical thinking skills in real-life contexts [2]. Critical thinking can and should be developed at any point during a foreign language lesson. There are no strict rules regarding when to use specific techniques. It can be at the beginning of a lesson, when ask provocative questions to spark students' interest, or in the middle of a lesson, when analyze a text or discuss different viewpoints. At the end of a lesson, students can be asked to formulate their conclusions and justify them.

In today's world, critical thinking is one of the most important skills, and its development should be a priority in education. The application of critical thinking development techniques not only helps students learn the language but also develops their ability to analyze information, evaluate arguments, make informed decisions, and approach problem-solving creatively. Moreover, such techniques contribute to the development of important cognitive processes such as analysis, synthesis, evaluation, and comparison. The success of developing critical thinking largely depends on the role of the teacher. The teacher should not only provide tasks but also create conditions for active student interaction, stimulating them to think independently and critically analyze information. Only in such an atmosphere can students develop their critical abilities and apply them in various life situations [3]. To foster critical thinking in schools, a specific methodology is employed that includes the following elements:

-presenting problem-based task. Students are given tasks that do not have a single correct answer, requiring analysis, synthesis, and evaluation of different solutions. For example, in a history lesson, this could involve analyzing a historical event from different perspectives, and in a literature lesson, interpreting a work.

-organizing dialogue. The teacher creates conditions for discussing problem-based tasks in a group or class. This allows students to exchange ideas, argue their point of view, and learn to listen to others;

-creating a safe environment for mistakes: Students are given the opportunity to make mistakes without fear of judgment. Mistakes are seen as a natural part

of the learning process and are used as an opportunity for further analysis and development;

-written reflection: Students record their thoughts and reasoning in writing. This helps them structure their knowledge, identify gaps, and gain a deeper understanding of the material.

This methodology not only develops students' ability to think critically but also contributes to the development of important skills such as communication, collaboration, creative thinking, and problem-solving [4]. Various techniques and intellectual tools can be used to develop critical thinking in students.

-individual: studying the basics of logic (syllogisms, induction, deduction),creating diagrams and charts (clusters, mind maps),keeping reflective journals;

-group:discussions and debates on current issues, role-playing games and simulations, group work on projects;

-written: writing essays, research papers, and analytical articles, writing summaries and annotations, keeping blogs and diaries;

-oral:presentations and project defenses, participating in conferences and roundtables, discussing texts and films.

The choice of techniques depends on the specific subject, the age of the students, and the educational goals set. It is important to remember that developing critical thinking is a long process that requires systematic work and the creation of an appropriate learning environment. The need to develop public discussion skills and overcome the associated difficulties. Developing critical thinking is closely linked to the ability to participate in discussions and defend one's point of view. However, many students have difficulty expressing their opinions, especially if they contradict the generally accepted one. Fear of making a mistake or being misunderstood often prevents them from actively participating in discussions [5]. To successfully integrate discussion skills into the learning process, it is necessary to:

-create a safe atmosphere: The teacher should create a classroom environment where every student feels comfortable and can freely express their thoughts without fear of judgment;

-encourage different points of view: It is important to emphasize that a diversity of opinions enriches the discussion and contributes to a deeper understanding of the topic;

-provide opportunities for mistakes: The teacher should emphasize that mistakes are a natural part of the learning process and that they help to learn from one's own experience;

-develop argumentation skills: Students need to be taught to construct logical chains, provide evidence, and argue their position;

Many students feel anxious when working in pairs or groups, or when sharing their thoughts in front of the class. The fear of being laughed at or making a mis-

take can make them reluctant to participate in dialogues. This is especially true in foreign language classes, where the language barrier can be intimidating. Students often worry more about grammar and pronunciation than about conveying their message.

Mistakes are an integral part of the learning process. They signal areas where additional attention and effort are required. It is important that both teachers and students view mistakes not as failures but as opportunities for growth and development. To foster a positive attitude towards mistakes, teachers can:

-create a safe classroom environment. Provide conditions where students are not afraid to make mistakes and are willing to share their thoughts;

-encourage attempts. Praise students for their attempts, even if the result is imperfect;

-provide constructive feedback. Help students analyze their mistakes and find ways to correct them;

-use alternative forms of assessment. Evaluate not only the final result but also the student's process, effort, and progress.

Incorporating critical thinking into language instruction, including peer interaction and teacher guidance, significantly improves students' ability to develop comprehensive listening and reading skills. As suggested by Young and Gamble, by offering students a structured progression of tasks, educators can empower learners to independently grasp the nuances and complexities of various texts[9]. This approach cultivates skills such as inference, evaluating information, and synthesizing ideas. Additionally, the use of authentic materials fosters students' engagement and interest in the subject matter, which has been shown to be beneficial for the development of listening and reading skills in foreign languages.

To cultivate critical thinking, educators should emphasize critical reading and listening, as many critical thinking abilities have parallels in these areas. However, successful development requires careful consideration of certain factors. For instance, learning materials should be accessible to all students and incorporate engaging or humorous elements to capture their attention. This approach not only enhances language proficiency but also ensures a deeper understanding of the subject matter, especially when the materials are designed to develop critical thinking through reading. Direct instruction in information literacy, including the development of skills in identifying information needs and evaluating alternative sources, is crucial. This empowers students to select appropriate sources for effectively addressing research questions. Engaging with challenging and controversial topics can foster the development of written communication skills. While peer interaction in the target language is essential, academic language, with its precision and formality, may be more suitable in certain contexts. To cultivate the vocabulary and concepts necessary for critically evaluating meaningful written texts, foreign

language curricula should incorporate sufficient thematic content. This approach not only enhances language proficiency but also promotes overall critical thinking. Furthermore, to develop critical thinking through listening, authentic and diverse materials should be employed to pique students' interest and enable them to compare and evaluate different perspectives.[6] Debates and a variety of intellectual challenges are effective tools for developing critical thinking and improving oral communication skills. Such exercises stimulate cognitive processes related to the evaluation of hypotheses, the weighing of arguments, and the formation of well-founded judgments. They contribute to the development of the ability to analyze information, identify logical fallacies, and construct persuasive arguments. When describing this approach, it is advisable to use the terminology of cognitive science, emphasizing its contribution to the development of such key competencies as critical thinking, communication skills, and problem-solving.

How can critical thinking be integrated into an already packed foreign language curriculum? As suggested in study [7]. English teachers seeking to cultivate critical thinking in their students should avoid making drastic changes to their existing programs. Instead, they can refine and repurpose existing lessons and units to facilitate greater student growth. English teachers have a unique opportunity to foster critical thinking skills in their students. To achieve this goal, simply discussing the importance of critical thinking is insufficient; practical application and skill development are essential. While direct instruction in critical thinking can be challenging, it can be facilitated through critical reading and listening activities, as previously discussed. It can be concluded that a foreign language teacher does not necessarily need to be able to explicitly teach students to "recognize inferences." Rather, their role may be to facilitate the development of this ability through regular reading and listening exercises. In this way, teachers can contribute to the development of students' ability to "recognize the speaker's inferences."

To ensure appropriate pedagogical interventions and to address the cognitive, affective, and behavioral aspects of critical thinking, a pedagogical model of the learning process is required. The complexity of such a model necessitates clear planning of expected learning outcomes, such as increasing students' critical thinking levels (goal setting), and the organization of active learning that creates a space for independent reflection and decision-making for each student. Additionally, it is necessary to create a positive learning environment that provides emotional incentives for successful critical thinking learning across various subjects.

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师范大学数字化发展的结构与过程模型
THE STRUCTURAL AND PROCESS MODEL OF THE DIGITAL DEVELOPMENT OF A PEDAGOGICAL UNIVERSITY

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注释。在文章中，作者将建模定义为师范大学数字化发展的有效工具。作者提出了师范大学数字化发展的结构和过程模型。模型的每个部分都有特征。

关键词：数字化转型、师范大学数字化发展、结构和过程模型、师范大学数字化发展模型。

Annotation. *In the article, the authors define modeling as an effective tool for the digital development of a pedagogical university. The authors present a structural and process model of the digital development of a pedagogical university. Each of the blocks of the model is characterized.*

Keywords: *digital transformation, digital development of a pedagogical university, structural and process model, model of digital development of a pedagogical university.*

Introduction.

Digitalization as an integral part of modern life has a significant impact on various areas of activity−from economics to social life. In the educational environment, digitalization has opened up new horizons for teaching methods, providing a wide range of digital tools that can significantly improve the interaction between

teachers and students, make the learning process more flexible and accessible, and create more engaging and practice-oriented educational environments.

The management of educational institutions has also undergone significant changes. Systems for managing the educational process, automated systems for monitoring academic performance and attendance, digital platforms for communication between all participants in the educational process have significantly increased the efficiency of administering educational institutions. Digital technologies not only improve the efficiency of management, but also provide extensive data for analytics, which helps make informed management decisions [2].

Pedagogical universities play a central role in training personnel capable of working in the digital society, which determines the processes of digital development of the pedagogical university, taking this process beyond professional training and affecting all areas and types of university activities. Pedagogical universities today are not only platforms for training future teachers capable of working in the digital environment, but also objects of digital transformations. To work effectively in the new conditions, they need to actively implement digital solutions, develop internal IT infrastructure and create innovative educational models, which ultimately helps to form specialists ready for the challenges of the digital future.

Modeling methods play a key role in the process of digital development of a pedagogical university, since the latter is an effective tool for analysis, forecasting and strategic planning. In the era of rapid digital changes, educational institutions face a number of complex issues: how to adapt to new technologies, ensure the integration of digital tools into the educational process and administrative systems, and how to improve the quality of training of teaching staff for work in a digital society [1; 7].

In this context, modeling allows: to analyze the current state of the pedagogical university; to predict possible changes; to find optimal development strategies.

Purpose of the article– to develop and characterize a structural and process model of digital development of a pedagogical university.

Main part.

Model of digital development of a pedagogical university*– is a systemic concept that describes the sequence of processes, structural blocks and relationships aimed at ensuring the effective functioning and evolution of an educational organization in the context of digitalization.* It integrates various aspects of the information, pedagogical and technological activities of the university, as well as the management of educational and research processes to achieve the strategic goals of the digital transformation of education.

Thus, modeling serves as a powerful tool that allows a pedagogical university to understand its own digital development strategy, build it on the basis of objective data and forecasts, and also clearly present processes and their interrelationships within the educational system.

One of the most effective approaches for such analysis and planning is structural and process modeling. Structural and process modeling in pedagogy is a methodological approach that is used to describe and design educational processes in order to optimize them and manage them effectively. The structural and process modeling that we have chosen to create a model of digital development of a pedagogical university allows us to take into account the static (structures) and dynamic (processes) aspects of digital development, which means analyzing the activities of the university, optimizing its structure and / or individual processes, introducing innovative educational and management technologies and tools. The structural and process model as a whole ensures systemic and comprehensive activities for the digital development of a pedagogical university.

The structure of the model we have developed includes conceptual-target, methodological, content-process and results blocks (Figure 1).

Conceptual and target block brings together the demands of the state, society, employers, and students themselves for the digital transformation of pedagogical education, which specifies the goal and objectives of the digital development of a pedagogical university.

Methodological block defines the scientific basis for the digital development of a pedagogical university, integrating the provisions of the system-synergetic, process, information-activity, technological and personality-oriented approaches, as well as a set of principles supporting them, to which we include the principles of the process approach, sustainable development, self-organization, self-development, systematicity, integrity, variability and anthropocentrism.

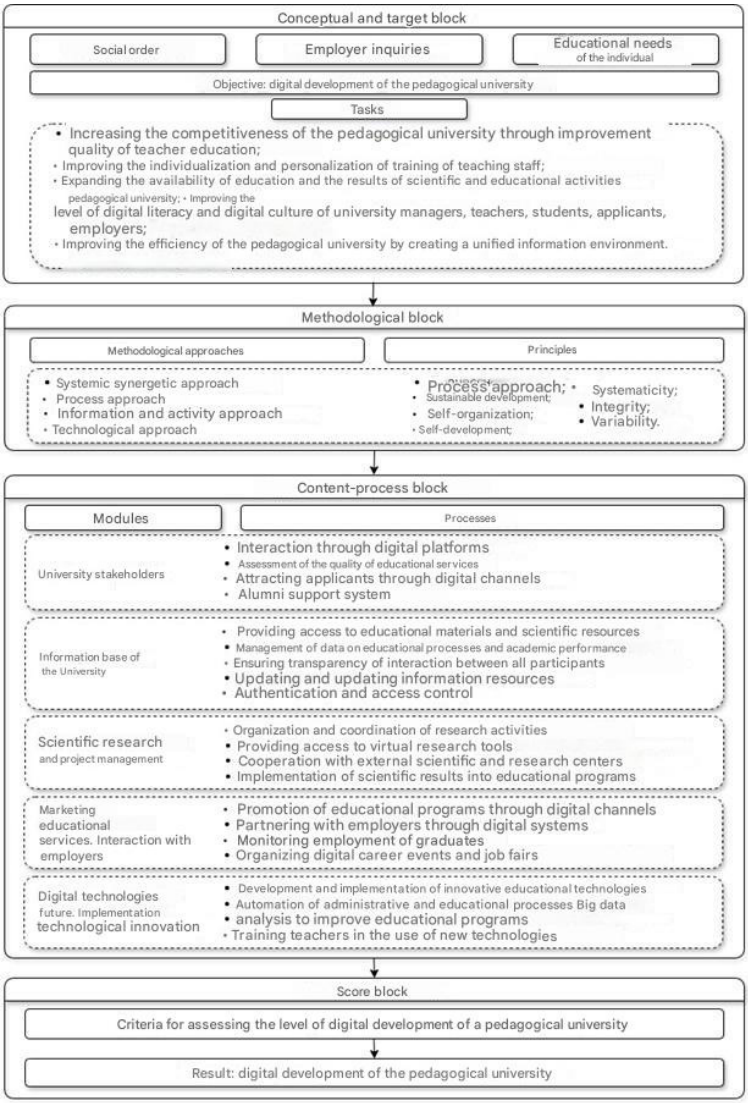

Figure 1. *Structural and process model of digital development of a pedagogical university*

Content-process block includes five modules, linking together direct and indirect participants in digital development (stakeholders); processes and systems

included in the information base of the university and ensuring, through the introduction of digital technologies, all types of its activities, with a special emphasis on research, marketing activities, and interaction with employers.

Let's clarify the content of each module.

Module 1 – University Stakeholders. This block is key, as it defines all (direct and indirect) participants in the educational process and their role in digital transformation [3]. In a modern pedagogical university, the main stakeholders are: research and teaching staff; managers of all levels, administrative staff; applicants; students; graduates; employers.

The processes of interaction between stakeholders and the pedagogical university are the basis of the university's digital development. They are aimed at improving the quality of education, optimizing the management of educational and scientific processes, and improving interaction with external partners. It is the stakeholders who put forward the main requirements for the format and content of the information they need, the interaction itself with various participants in educational relations, the opportunity to participate in the management of the university and its development.

Module 2 – University information base. Digital development of an educational institution of higher education is impossible without the creation and effective functioning of its information base. It is a complex of interconnected systems and resources that provide information support for all processes at the university, from educational activities to administrative and scientific projects [5].

Module 3 – Research and Project Management. Laboratories. In the context of the digital development of a pedagogical university, the key aspect is the organization of effective management of scientific research and projects. This allows for the integration of innovative scientific developments into the educational process, strengthening cooperation with external partners, and modernizing research activities through the use of digital technologies [6]. This level of the structural and process model includes several critical components: research laboratories, platforms for organizing project work, as well as innovation and development centers.

Module 4. – Marketing of educational services and interaction with employers. The digital transformation of pedagogical universities requires a revision of approaches to promoting educational programs and interacting with employers. Modern digital technologies make it possible to strengthen the marketing of educational services, improve the quality of communication with employers and significantly improve the career prospects of students and graduates [4; 8]. The fourth module of the substantive and procedural block of the model covers these key aspects, ensuring more effective use of digital solutions to promote programs and establish mutually beneficial cooperation.

Module 5. – Digital technologies of the future. Implementation of technological innovations. Digital technologies of the future play a key role in the transfor-

mation of the pedagogical university, allowing for more flexible, personalized and innovative educational processes [9]. This level includes the implementation of advanced technologies such as artificial intelligence (AI), augmented and virtual reality (AR/VR), big data, blockchain, neurotechnology and cognitive science. These technologies not only improve administrative processes, but also significantly change approaches to teaching and interaction with students, making learning more interactive and focused on practical application.

Result block characterizes the criteria by which one can assess the level of digital development of a pedagogical university and the degree of achievement of the set goal. We have identified technical and technological, informational and content-based, scientific research, personnel criteria and the criterion of the level of interaction of the university with external partners.

Conclusions. The article presents a structural and process model of digital development of a pedagogical university, which covers key aspects of the transformation of the educational process in the context of digitalization. The model includes four main blocks: conceptual and target, methodological, content and process, and result. Each of these blocks is interconnected with others and is an integral part of a single system, which emphasizes the importance of an integrated approach to digital transformation.

In this model:

- all levels are connected by digital platforms and tools, and the information base plays a key role in coordinating all processes, acting as a central element;
- Stakeholders interact with the knowledge base through digital interfaces to manage research, learning and career opportunities;
- Technological innovations are being introduced at all levels, influencing both management and the educational process.
- Each of the blocks of the structural and process model covers important aspects of the functioning of the pedagogical university and its transition to a digital ecosystem, providing a holistic approach to the modernization of the educational process.

The digital development of a pedagogical university is not limited to the implementation of technological solutions, but involves a profound transformation of all levels of management and training. An important aspect is the integration of technologies to improve interaction between participants in the scientific and educational process, the creation of a flexible information environment and the use of innovative teaching methods.

Understanding the structure and processes underlying this model allows pedagogical universities to effectively plan and manage the transition to a digital future, ensuring not only high-quality education, but also their competitiveness in the conditions of the modern digital economy.

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未来专家职业准备目的建模中的教学反思
THE PEDAGOGICAL REFLECTION IN THE MODELING OF THE PURPOSES OF THE PROFESSIONAL PREPARATION OF THE FUTURE SPECIALISTS

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摘要。本文提出了在未来专业人才的职业准备过程中使用教学反思的问题，特别是基于对未来法学学士教育专业计划实施过程中使用教学反思的经验的分析。新知识以已知方法论方法的互补性为代表，这些方法论方法用于教育专业计划目的的建模、对教学反思的新解释以及使用经验的概括和对价值语义方向的反思程序的认可。

在从这个角度对问题进行研究时，确定了实现教学反思的矛盾；确定了影响教育专业模式建设现代进程的因素；在哲学方法论的层面上，阐述了受教育者新的世界观立场，这些立场对其个人教育轨迹的价值动机选择有着重大影响。阐述了教育反思在未来法学学士的总体文化和职业发展过程中的作用。阐述了教育反思在职业准备目的形成过程中的可能性，特别是在教学过程的建模中。提出了方法论的参考点，需要考虑教育计划在现阶段社会发展中公众意识和人类世界观中发生的变化（后形而上学思想、语言学转向、拒绝承认理论优于实践、思想的具体化）；教育反思的价值语义传递方法论，将教育反思概念化为将学生“嵌入”单一文化教育空间主体的共同生命活动的过去、现在和未来的一般文化意义中的特殊的哲学教育程序。

关键词：价值论方法、互补性、交际对话能力、元活动、方法论、思维、教育专业计划、世界观变化、哲学教育反思。

Summary. *The problem of the use of the pedagogical reflection in the process of the professional preparation of the future specialists has been actualized in the article, in particular based on the analysis of the experience of its use in the realization of the educational-professional program of the future bachelors of the law. The new knowledge has been represented with the complementarity of the known methodological approaches to the use of the pedagogical reflection*

in the modeling of the purposes of the educational-professional program, the new interpretation of the pedagogical reflection and the generalization of the experience of the use and the approbation of the reflexive procedures of the value-semantic direction.

In the research of the question from the point of view, the contradictions of the realization of the pedagogical reflection have been determined; the factors of the influence on the modern process of the building of the educational-professional models have been installed; at the level of the philosophical methodology, the new worldview positions of Homo educandus have been explained, which influence significantly on its value-motivational choice of the personal-educational trajectory. The role of the pedagogical reflection in the process of the general cultural and the professional development of the future bachelor of the law has been installed. The possibilities of the pedagogical reflection in the procedure of the formation of the purposes of the professional preparation, in particular the modeling of the process of the teaching have been characterized. The methodological references-points have been presented with the need of the consideration in the educational programs' changes that have been occurred in the public consciousness and the worldview of the human at the present stage of the development of the community (the post-metaphysical thinking, the linguistic turn, the refusal of the recognition of the advantage of the theory over the practice, the concretization of the mind); the methodology of the value-semantic sending of the pedagogical reflection, the conceptualization of the pedagogical reflection as the special philosophical-educational procedure of the "embedding" of the student in the general cultural meanings of the past, of the present and of the future of the common vital activity of the subjects of the single cultural-educational space.

Keywords: *axiological approach, complementarity, communicative-dialogical competence, meta-activity, methodology, thinking, educational-professional program, worldview changes, philosophical-educational reflection.*

1. Introduction

Today the advancement of the society in the measurement of its iconic of the educational-cultural markers has appeared in the most researched sources as the "information society". But, we think, that more correct name of this historical form of the existence of the human and the society on the global scope should be the name of the "information society", which has come to replace the "society of the knowledge" and it has affected significantly all spheres of the vital activity of the human. The spread of the informative factors in the culture of the individual has changed significantly his worldview position, which can be defined as the new worldview movement (J. Habermas), which, first of all, has been touched the young people, who study and who are disposed to the perception of

the new knowledge, the new technologies, the new forms of the educational and the professional activities. The "the society of the knowledge", which has failed to harmonize the dynamics and the dialectics of the objective and the subjective factors of the development of Homo educandus in the purposes and the contents of the education, in particular in the professional preparation of the applicants of the higher education, it has given way to the informative way of the teaching and the vital activity. The large number of the researches show that the presence of the certain achievements in the democratization and the modernization of the higher education in the process of its informatization, and the significant problems that need immediate comprehension *(Aron, 2012; Bauman, 2004; Habermas, 1988; Lonergan, 2010; Troitska, Osadchyi, 2019 and other researchers).*

The significant part of these problems is associated with the presence of the huge number of the informative, the digital technologies, the programs of the teaching and the insufficient analytics and the value-semantic reflection of the educational activities, which should be added to the modeling of the informatization and the educational processes of the communicative-dialogical direction, and also as in the conceptual and in the contextual measurement to strengthen the personal (in the form) and the axiological and the praxeological (in the essence) nature of the extraction of the qualification in the higher education.

At the same time, based on the analysis of the research literature in the subjectivity of the pedagogical modeling, in particular the process of the formation of the purposes and the contents of the professional preparation of the bachelors of the law, we have been noted several contradictions:

- in the innovative move of the pedagogy, that uses in the modeling of the processes and the actions of the normative documents, the expert assessments, the empirical material, first of all, the new worldview changes in the modern education are not always taken into account;

- the modeling takes place mostly within the technocratic paradigm of the preparation of the future specialist, in which the model of the professional personality is strictly regulated, which is not always based on the pedagogical technologies with the creative, with the personal orientations and the reflective procedures;

- the pedagogical reflection and the reflection of all subjects of the pedagogical process are insufficiently involved in the construction of the educational trajectories of the personality, and also there is a lack of the awareness of the complexity of the phenomenon of the reflection and its methodological potential.

That is why the scientific novelty will be represented with the complementarity of the known methodological approaches to the use of the pedagogical reflection in the modeling of the educational purposes and the professional self-determination, the new interpretation of the pedagogical reflection and the generalization of the experience of the use and the approbation of the reflexive procedures of the value-semantic direction.

The research of the question enables, from the new point of view, the solution of the contradictions that has led to the purpose of our research such as to determine the methodological references-points of the pedagogical reflection in the modeling of the purposes of the professional preparation of the bachelor of the law and to install the factors of the influence on the modern process of the building of the educational-professional model, which, in our opinion, cannot be the educational-professional program.

This new aspect of the research is realized in the process of the implementation of the following tasks:

- at the level of the philosophical methodology to explain the new worldview of the positions of Homo educandus, which affect significantly its value-motivational choice of the personal-educational trajectory;
- to determine the role of the reflection in the process of the general cultural and the professional self-determination of the future bachelor of the law;
- to install the possibilities of the pedagogical reflection in the procedure of the formation of the purposes of the professional preparation, in particular the modeling of the process of the teaching.

2. The worldview factors of the modern higher education

If the changes will be crystallized, which have been occurred in the social consciousness and the worldview of the human, it should be talked about four methodological moves: the post-metaphysical thinking, the linguistic turn, the refusal of the recognition of the advantage of the theory over the practice, the concretization of the mind *(Habermas, 1988).* It should be recognized that these changes in the human consciousness are associated with the "postmodern" culture, which is characterized with the overstatement of the novelty of own vital activity of the human, too "critical" attitude to the experience of the previous generations, the overstatement of the importance of their "truth", their microcosm, the lack of the level of the conversance, the will, etc. In such conditions, the methodology of the building of the personal trajectories of the receiving of the higher education should be understood in terms of not only as the organizational-practical, but it is also the worldview-semantic *(Troitska, 2019).*

That is why in the actualization of the mentioned problem we give the prominent place to the modeling of the pedagogical activity as the reproduction of the reality, as the visual representation of the properties of the researched object, which is "formalized, simplified" in the model, but this procedure facilitates the reproduction of the properties, the connections, the tendencies of the researched system and the processes and it allows summing up their condition, making the forecast, making the well-grounded decision.

In the diversity of the forms of the modeling, which depend on the structure of the model and the sphere of its application, many strategies, the technologies, the

practices have been worked out, which are paid attention: the different approaches to the pedagogical modeling are in the works of A. Verbytskyi, P. Rastiannikov, O. Shavrina *(Shavrina, 2000);* the possibility of the modeling in the overcoming of the gap between the teaching and the education, between the procedural and the general cultural development of the personality of the future specialist, the principles of the model approach of the active socio-psychological teaching, the technology of the building of the models, the ways of the practical realization them in the group, the types of the didactic models and the role of the pedagogical reflection have been considered.

The target model is the subject of our interest, in which, according to O. Shavrina, "…the meaningful and the categorical purposes of the teaching are determined. The meaningful purposes are the specific knowledge, the skills and the abilities which subjects of the teaching must master. The categorical purposes are based on the working of so-called the taxonomies, that is the groups of the categories of the purposes, each of which express the certain totality and the sequence of the intellectual operations, such as the knowledge, the understanding, the use, the analysis, the synthesis, the mark. All conclusions which have been obtained on the correlation of the blocks of the material with the correlated meaningful purposes and also with the results of the teaching and, so, with the categorical purposes and they will be the target model of the process of the teaching" *(Shavrina, 2000: 44).*

3. The reflection in the pedagogical modeling

The reflection as a product of the philosophizing in the understanding from the Renaissance has been taken the worthy place in the culture of the thinking as the source of the cognition (J. Locke), as the transcendental reflection, as the ability of the thinking (I. Kant), the absolute reflection as the dialectical methodology of the cognition (G. Hehel), as the phenomenon of the consciousness (E. Husserl), as the "producer" of the values of the true and the being, and others. The modern philosophy highlights the methodological functions of the reflection aimed at the reproduction by the thinking of the universal connections of the world, which it (thinking) has been considered in isolation *(Bulatov, 2009: 425),* which is characterized the reflection as the self-consciousness and the self-knowledge, the correlation of the elements of the thinking and the reality. It is no coincidence that D. Borkhers defines the reflection as the standard of the scientific methodology and the moderator of the interdisciplinary dialogue.

In this sense, the understanding of the the reflection as "the process of the comprehension of something with the help of the study and the comparison… and the "new turn" of the spirit after the implementation of the cognitive act to the I (as the center of the act and its microcosm) is deserved to the attention, thanks to it becomes possible to appropriate what has been known" (Philosophical Encyclopedic Dictionary, 2002: 394). Actually, it should be returned to the opinion of

B. Lonergan, who, in our opinion, has deployed the essence of the reflection in its pedagogical form, developing the doctrine of the functional specialization of the theology and the criterion-defining value as the transcendental idea, he wrote: "The value is intensified in the questions , which require the thinking just as intelligible is intensified in the questions that require the intellect, and the true and the being is intensified in the questions that require reflection**"** *(Lonergan, 2010).*

As in the process of the modeling of the purposes and the contents of the education there is both the methodology of the new construction and some awareness of this methodology by the participants of the modeling, so the pedagogical reflection, in our opinion, should have double character: on the one hand, the methodology of the search and the creation of the new requires clear criteria of its creation on the principle of the efficiency, the intellectuality and the ethics, on the other hand, it is the a reflection of the values-worldviews position of the applicants of the professional education, who do not present the rigid professional model of the future specialist and his image.

4. The pedagogical reflection in the modeling of the purposes of EPP from the practical experience

As it has been mentioned above, today the positions of the subjects of the higher education should take into account in all components of the educational process, it is usually necessary to take into account the changes in the worldview of the young people. As, if we interpret the post-metaphysical thinking as one that reflects the paradigmatic orientation to waive the presumption of the possibility of the building of the single conceptual model of the world, or the process or the event, and also to understand that it differs from the desire of the appropriateness, the conformity with the maxims, the norms, the sustainable principles, so, it is necessary to use the information discursive variants of the decision of the problem only in the dialogical way *(Troitska, 2016).*

It means for us that the motivational and the cognitive component of the teaching and the choice of the personal educational trajectory, in particular the purpose of the education, it should be on the principle of the complementarity which is added with the communicative-dialogical. It, involving the reflection, fills the choice of the purposes with the meanings and the values of all participants of the process. In this way, a person has the wide opportunities of the building their own trajectories in the informative space and the integrity of the explicit and the implicit components of the reflection and the harmonization of the introverted and the extroverted features.

If in the purposes of the educational-professional program of the preparation of the bachelors of the law (hereinafter EPP) the formation of the ability to protect the rights and the freedom of the citizens guided by the principle of the rule of the law and followed the ethical standards of the legal branch, the providing of the

appropriateness of the preparation of the Standards of the higher education in the specialty, the mission, the vision, the values of the university and the orientation on in-depth practical preparation of the qualified, the competitive, the competent graduates should be noted so, these references-points should be perceived by the subjects of the education not only as the appropriate, the normative, but also those that correspond their interests and the desire. That is why at the numerous meetings of the applicants of the higher education, of the lecturers and of the potential employers (stakeholders), the complex of the general and the special competencies has been processed reflexively, which has been supplemented with the formation of the values and the worldviews grounds of the future lawyers, their ability to realize the personal features, the worldview and the way of the thinking, and to develop as the creative person, the intellectual with the critical thinking and with the scientific worldview and as the educated conscious citizen [http://geo.mdpu.org.ua/prirodnicho-geografichnij-fakultet/kafedra-prava/osvitnij-protses-kafedri-prava/].

So, in this way the linguistic turn of the worldview "works", that provides the great opportunities of the "proclamation" of the informatization through the discursive practices as the "meetings" of the subjects of the different preferences, through the different linguistic constructions, the narratives, the dialogic interpretations, etc. The new knowledge, which has been enriched with the multicultural values and the meanings, it enables the way to common values and the meanings, to the adoption of the practical rules of the common mastering of the professional, the intellectual, the ethical and the spiritual norms of the common to all mankind life.

Moreover, in the communicative-dialogical activity there can be the constant increase of the level of the reflexive qualities of the personality of the future specialist, because in this activity both the external (the explicit) form of the reflection and the internal (the implicit) are interacted, the contradictions between the subject's expectations and the actual reaction of the object, etc. are interacted

For the understanding of the pedagogical reflection, it is also important comprehension of the reflexive-innovative process in the humanities, which are considered it in the different socio-cultural contexts (L. Vygotskyi, A. Leontiev, D. Elkonin, V. Slobodchikov, G. Shchedrovytskyi and others). The reflection in these contexts is understood not only as the process of the rethinking and the heuristic overcoming by the subject of the patterns of the thinking, but also as the new type of the thinking, the new way of the communication, including the different values-worldviews positions, the experience of the cultural-discursive practices and the individual-creative properties of the personality. Such model of the pedagogical reflection has the tendency, in our opinion, to become the certain methodological construct, in particular in the professional preparation of the future specialists at

all levels of the methodology. This methodology orients the pedagogical reflection not on the comprehension of the technological processes of the teaching, but on the in-depth, thoughtful meta-activity as for the initial cause and the principles, which are the basis of thinking about the education, the culture, the personality, and so on, as the knowledge about the receiving of the new knowledge and the quintessence of the approaches, the principles and the methods of its growth, and as the requirement for the compliance in the researches and the activities of the cultural maxims.

We propose to consider the pedagogical reflection as the procedure of the philosophical activity, which is significantly different from many components of the philosophical fund (analysis, synthesis, homogenization, totalization, universalization, theorizing, generalization, etc.). Moreover, it is not the critical thinking, which is "promoted as a brand" today, but is formed, in our opinion, without the analytical techniques and the reduction of the creative thinking.

So, generalizing the experience of the reflective-pedagogical activities as for the modeling of the purposes of the educational-professional preparation of the future bachelors of the law, at the level of the specific (the philosophical-educational) methodology, we note:

- the pedagogical reflection should become thinking, which in form always returns to the subjectivity (in our case it is the purpose, the contents, the organizational-administrative conditions of the professional preparation of the future lawyers) conceptually to the ultimate, the marginal principles which are comprehended, the ways of its fixation, the different manifestations of the natural, the social, the cognitive, the anthropological factors;

- the reflection highlights the amplitudes (the originality of the subject, its spiritual formations, the beliefs and the ideals, the totality of the semantic, the value, the existential, the willed intentions and the determinations) of all subjects of the common activity;

- in such way, the reflection "builds" the modern students in the common to all mankind search, returning to the eternal sacramental questions (How? Why? What for?) to the past and the future (other contexts);

- perceiving unquestionably the position that the philosophical-pedagogical reflection, as the reflection of the second order (it theorizes not the subject of the reality, but the images, the notions and the categorical-logical forms of the reality), it deals with the ideas, the principles that stimulate spiritually the personality and it orients on the humanity of the purpose and the activities.

5. Conclusions

The research of the problem and its formulation in such aspect has been confirmed the actuality of the involvement in the innovative move of the pedagogy of the philosophical-educational reflection, which allows taking into account in

the modeling educational processes and the actions of the worldviews of the attitude of the subjects of the education, the use of pedagogical technologies with creative, the personal orientations and the reflective methodological procedures of the axiological direction. The explication of the reflection, from the point of view of the modern philosophy, as the self-consciousness and the self-knowledge, as the correlation of the elements of the thinking and the reality, as a methodology which aimed at the reproduction in the process of the thinking of the universal connections of the world, as the standard of the scientific methodology and the moderator of the interdisciplinary dialogue, it gives the opportunity to prevent, on the one hand, the exaggerated reduction of the reflection to the partially-practical procedure and, on the other hand, it has generalized it to the thinking as such.

The functioning in the educational process and in the modeling it through EPP without the pedagogical reflection is not possible: neither motivational, nor cognitive, nor organizational-activity components of the teaching will become effective without students' choice of personal educational trajectory, in particular the purposes of the education, without the communicative-dialogic interaction and the consensus, without the common choice of the purpose based on the meanings and the values of all participants of the realization of the EPP process. In this way there are the wide opportunities of the building of the applicants of the higher education of their own trajectories of the move in the cultural-educational space and it provides (apodictically) the integrity of the explicit and the implicit components of the reflection and the harmonization of the introverted and the extroverted features of the subjects of the education.

The methodological receptions, namely: the approval in the consciousness of the human of the post-metaphysical thinking, the philosophical-linguistic comprehension of the reality, the concretization of the mind, the practice-oriented teaching and the education, the providing of the discursive communication, the communicative-dialogical interaction and the humanity (human dimension) of the subjects of the education should be the object of the deep pedagogical reflection of all components of the educational-professional process, and their research is the subject of our further scientific work.

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将体育技术转化为设计训练系统的发展和改进机制
CONVERSION OF SPORTS TECHNOLOGIES AS A DEVELOPMENT AND IMPROVEMENT MECHANISM FOR DESIGNING TRAINING SYSTEMS

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摘要。本文介绍了将体育技术转化为训练系统以提高其功能效率的理论和方法基础，以及在相对独立的体育文化和体育活动领域进行转换操作的实际方法：以体育为中心的体育教育和大众体育，其具体目标和目的，在这些领域工作的专家的不同能力水平，以及设计高性能运动训练系统的方法。

关键词：转换的理论和方法基础；训练系统的现代化和设计；进行转换操作的方法。

Abstract. *The article describes the theoretical and methodological basis for the conversion of sports technologies into training systems in order to increase the efficiency of their function, as well as practical ways of conducting conversional operations in relatively independent areas of physical culture and sports activities: sports-centric physical education and mass sports, with their specific goals and objectives, different competence levels of specialists working in these areas, as well as a way to design training systems in high-performance sports.*

Keywords: *theoretical and methodological basis of conversion; modernization and design of training systems; methods of conducting conversional operations.*

The term “Conversio” translated from Latin means “transformation, change”. Conversional changes of an object are performed in order to obtain new properties and qualities of said object. Conversion in the field of physical education and sports means using theoretical and practical achievements applied in the training of Olympic athletes for the interests of physical education and sports.

Some aspects of solving the problems of conducting conversional procedures are presented by the author in a number of his previously published works [1,2,3,4], and this article presents a holistic theoretical and methodological justification for the conversion of sports technologies and practical ways of conducting conversional operations. The developed conversional methodology highlights the

theoretical side and practical ways to implement it. The theoretical part is based on the patterns and principles of conversional transformations.

Conversional patterns of sports technology:

1. The possibility of conversion is determined by the relationship between the nature of the technology and the specifics of the competitive activity of sports discipline being "enriched".
2. The effectiveness of the converted sports technology after adaptation to new conditions depends on the degree of preservation of its conceptual framework.
3. The nature of conversional changes in the sports training system being enriched depends on the class of technology being converted.
4. The process of introducing and adapting sports technology from high-performance sports into physical education and training process of schoolchildren is based on the relationship between horizontal and vertical conversional directions.

Conversional Principles:

- principle of the primacy of the purpose of the conversional operation establishes that it is the purpose of the conversional operation that is the priority, determining the directions and nature of adaptations;
- principle of subordination of the implemented technology and the "own" technologies of the training system determines the entry point for technology introduction into the training system and the nature of changes in the training system produced by said implementation;
- principle of compliance of the converted technologies with the conditions of competitive activity in the sports discipline being enriched, allows us to determine the "technological compatibility" of the implemented technology and the training system being enriched;
- principle of successive stages of conversional procedures means that the adaptation of the converted technology in a new environment is carried out in several stages with their own qualitative features;
- principle of preservation of the conceptual basis of the converted technology establishes the possibility of achieving the planned effect of using this technology in a new environment;
- principle of changing the content of the converted technology determines the direction of adaptive transformations in technology being implemented;
- principle of changing the content of the training process of sports discipline being enriched determines the possibility and direction of "connections" between converted technologies and technologies being enriched.

The theoretical side of the conversional methodology has been embodied in three practical ways of its implementation. Various methods of conducting con-

versional operations are necessary for three seemingly independent areas of physical culture and sports activities: sports-centric physical education, youth and mass sports, high-performance sports, with their own specific goals and objectives, and a different set of competencies for specialists working in these areas. Therefore you need relatively simple and affordable tools for mass use but also high-precision ones used both to modernize the training systems for highest ranked athletes and to design new high-tech technologies. Based on this each conversional approach has its own set of objectives to be solved determined by the specifics of the levels of sports activity.

The first approach is designed to modernize the training systems used in sports-centric physical education and children's sports. The essence of modernization procedures is that the procedural part of the technology being implemented without changing training techniques and programs is implemented into the training system being enriched. Only the training load is adjusted accordingly based on the characteristics of the training contingent of athletes. In other words the "outdated" procedural part is replaced by a more effective procedural part from the implemented technology in the training system being enriched. The two training systems are connecting mechanically. With this approach of conversion it is necessary to solve three main objectives in the process of technology implementation:

1. Choosing the technology that solves the appropriate training objectives.
2. Determining the entry point of technology implementation in the training system being enriched.
3. Adjusting the exercises applied (without changing their orientation) and the training load in accordance with the characteristics of the contingent of athletes.

Overcoming these objectives and solving the problem of selecting the appropriate technology occurs according to the methodological principle of "Compliance of the converted technologies with the specifics of competitive activity in the sports discipline being enriched." The technology being implemented must meet the following criteria:

- Conforming to the specifics of the competitive activity in the sports discipline being enriched, the technology being enriched should take into account the kinematic and dynamic characteristics of motor actions (non-specific technologies can be modified or applied unaltered). Therefore, the target goal of the implemented technology should coincide with the goals and objectives of the sports training system being enriched.
- The procedural part of the implemented technology should solve training objectives more effectively than the "outdated" procedural part of the training system being enriched (to bring athletes to a higher level of fitness, to bring them into a state of athletic shape on a specific timeframe, etc.).

The second of the above objectives is solved as follows: to reduce the likelihood of negative interference the appropriate entry point to introduce the technology into the training system is the beginning of the next training stage. Provided that it is in continuity with the previous stage in terms of total load, the structure of partial loads and the training tools used, the process of developing fitness and entering the state of athletic fitness in the preparatory period or its preservation in the competitive period of the annual cycle will continue.

Solving the objective of adjusting the applied exercises and training load in accordance with the characteristics of the contingent of athletes is based on methodological principles: "Subordination between the implemented technology and "own" technologies of the training system", "Changing the content of the converted technology" and "Changing the content of the training process of the sports discipline being enriched". In fact, adaptive manipulations relate mainly to special developing training tools and may partially affect special preparatory exercises. Because in special developing exercises muscle operation modes and other body systems are set at the level of competitive modes or exceeding them. In this regard, methods are being replaced by those that correspond to age and gender characteristics, level of training and other factors. There is also an adjustment of partial volumes of the training load while maintaining their structural balance in order to avoid disrupting one of the essential mechanisms of the implemented technique. Additionally, in order to reduce the impact of issues associated with errors between the applied technology and the system being enriched, it is recommended to limit the scope of conversional transformations through this method of conversion into meso- and microtechnologies.

The first approach of conversion is characterized by ease of use and it's accessible to a wide range of specialists in the field of physical culture and sports which implies its mass use.

When you convert using the second approach, unlike the first one, not the whole technology is introduced into the training system being enriched, but separate ready-made "blocks" adapted for the goal and objectives of the conversion - structural and functional components (structural schematics, training programs consisting of sets of exercises of various orientation, training methods that determine the specifics of performing exercises in training classes, their volume and intensity of performance in the micro-, meso-, and macrocycles). Structural and functional components are used, both from the technology being implemented and components of other technologies that meet certain criteria.

The fundamental element of the forming technology is the selected "design blueprint" — a method for constructing the training program. The primary criterion for selecting and customizing the method for constructing the training

program is its capacity to fulfill the function required by the objectives of the conversion. Clearly, the most suitable approach to constructing the training program must be tailored to the conversional context. To do this, the time frames of the stages and blocks (depending on the method of constructing the training process) should be adjusted in such a way as to create conditions for the course of adaptive restructuring at the level of various body systems and ensure the implementation of a given dynamics of the athlete's condition in the annual training cycle. The foundation for these adjustments is information about extremes of time required for the implementation of adaptive changes in the development of different motor skills.

But the structure of the forming training system will take its final form only after the adaptation of the implemented training programs. The selected programs must meet the following criteria:

1. Adequacy of the goal both for the objectives of the training process, accumulated volume and for the nature of the training work.
2. Compliance with the logical structure (stage, block, period) of the training process.
3. The functionality of the program. It is necessary to follow set program of actions, their sequence, order of repetition to precisely normalize loads and rest intervals and form specific functional systems in athlete's body that contribute to achieving a high athletic result.
4. Harmonious relationship with other programs in a single training system. Ideally, the implemented programs should not only fit into the training system, but also achieve synergy in interaction with each other.
5. Compliance with the timeframe. According to the duration of application, the implemented programs must be entered into at the appropriate training stage, period. Therefore, when adapting the implemented programs some of them will have to be shortened, and some will have to be lengthened provided their functionality is preserved. When you change the duration of the programs and their functionality suffers, then it is better to follow the path of adjusting the time frames of stages, blocks, etc. Therefore, the final timeframe of the structural formations of the training process is determined after the adaptation of the implemented programs.

A characteristic feature of these first and second conversional approaches is that they are based on a single approach – "technological continuity", which consists of choosing such technologies or structural and functional components of technologies that have already been successfully used in the training process to modernize training systems.

Logical development of the theoretical part of conversional methodology in practical ways of its implementation made it possible to expand the sub-

ject of conversion to the construction of high-tech technologies designed to train athletes of the highest ranks. The necessity to create a third approach is driven by the fact that it is impossible to indefinitely upgrade sports technologies, as, eventually, they reach their modernization limit. Additionally in training systems upgraded with first and second approaches it is difficult to achieve high-precision impacts. To solve the problem of achieving high accuracy (basically, high efficiency) of sports technologies, the following approach is introduced: forming a conceptual component of a training system based on conversion from the entire variety of achievements in theory and practice of sports training of such training mechanisms that will contribute to the implementation of the system's function. However, the converted mechanisms must meet two main criteria: providing function of the training system under specified conditions and also fit into the system of mechanisms of the conceptual component.

In addition to mechanisms providing function, the system of mechanisms of conceptual component of the training system uses mechanisms establishing the framework for transforming training from diverse drills into actual competitive actions, ensuring positive interaction between exercises of different types and mechanisms regulating the interaction of the "work-rest" phases in training sessions and micro- and mesocycles of training. Simultaneously, the emphasis of training effects and load parameters is aligned with the natural rhythm of the age-related development of kinesiological potential of the training person and his current condition. Precisely the system consisting of the most effective mechanisms and connections between them developed taking into account the genotypic predisposition and phenotypic readiness of the athlete's body for the direction, volume and intensity of loads ensures high accuracy of training effects. In turn formed system of mechanisms determines the rules for building a training system: periods of training process, necessary tools, methods, etc.

Appropriate system bases have been developed to implement proposed approach. The first systemic basis is the goal and objectives of the training system's operation. The goal is the initial origin, the system-forming factor when forming a training system: thanks to the goal the elements of the system combine and function in order to achieve it. Additionally the objectives of the training system functioning specify the function while organizing necessary structural and functional components. The list of objectives limits the number of issues that need to be adjusted when building a training system, which in turn limits the number of system mechanisms. There should be precisely as many of them as necessary to effectively achieve the goal, so as not to "overload" the forming training system.

The next systemic basis is the pattern of conversion, which determines the possibility of introducing and adapting high-tech technologies into the training system being "enriched". This pattern allows us to identify the *systemic nature of the mechanisms* within the forming training system. The defining characteristic of a mechanism within the system of mechanisms of conceptual framework of the forming training system is the correlation between the issues addressed by the mechanism in the training process and the specific aspects of competitive performance in sport for which the training system is being developed. The main criterion of the "systemic nature" is the effectiveness of achieving the goal.

The third systemic basis is the factors that determine the construction of the structure, content and procedural deployment of the training process. These factors are determined by the characteristics of the trained contingent: age, gender, initial and planned level of preparedness. At each stage of long-term sports training, the decisive influence of factors is variable. From stage to stage of long-term training the number of factors contributing to the maximum realization of athletes' athletic and achievement capabilities increases which complicates the structure and content of the training system. The structure of an athlete's fitness, the leading components that determine the level of achievement and lagging components that prevent an increase in his level, as well as his anatomical and physiological inclinations, are also analyzed. Correlation of that data with the goal and objectives of the training allows you to build individual structure of the training process. You analyze the training volumes mastered by athletes of the appropriate qualification and individual training experience at previous stages of training to establish the quantitative characteristics of partial loads. The most significant indicators of special training are identified, the level of which needs to be increased, but also identify the amount of their increase. Setting individual parameters or the entire set of indicators of the internal side of the competitive load in the training process allows you to control the effects of training loads with a greater degree of accuracy.

The approach is designed to create training systems used in the training of elite athletes. It is quite difficult to use. The complexity of the third conversional approach is due to the complexity of the objectives which require the necessary work of a wide range of specialists with their abilities for projective thinking based on the most cutting edge scientific achievements and the need to operate large amounts of information. Therefore, for the successful use of the third conversional approach a need arises for widespread use of artificial intelligence technologies. Firstly, this will minimize the likelihood of errors at the design stage of the conceptual component of the training system. Secondly, forming conceptual compo-

nents of training systems with necessary parameters in most sports disciplines in a short amount of time. This will drive the massive emergence of high-precision training systems in high-performance sports.

Developed on the basis of the conversional methodology, three approaches of its practical implementation make it possible to solve a whole range of issues of working with training systems: modernize existing ones, as well as design innovative ones, both in "manual" mode and using digital technologies. The revealed patterns, formulated principles and practical ways of carrying out conversional operations developed on their basis make a significant contribution to solving two important problems of the theory and methodology of physical education and sports training:

1. Modernization of physical education and training systems through the introduction of highly effective sports technologies.
2. Designing high-tech sports technologies for athletes of the highest ranks.

This opens up the opportunity to provide a significant increase in the socio-cultural effectiveness of the physical education field for children and adolescents, as well as high-performance sports field for elite athletes. The most significant effect is that the widespread adoption of conversion will contribute to the broadening of professional horizons, enhance professional competence, and foster systemic thinking among a diverse range of professionals in the field of physical education and sports.

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体育教练和体育教育中的专业知识差距：叙述性评论

PROFESSIONAL KNOWLEDGE GAPS IN SPORT COACHING AND PHYSICAL EDUCATION: A NARRATIVE REVIEW

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摘要。体育教练和体育教师的有效性取决于他们的专业知识和发展。本叙述性评论考察了教练和体育教师对专业知识的自我评估，探讨了他们对专业发展的兴趣以及他们面临的障碍。用英语和俄语进行了文献检索，重点关注 2016 年至 2024 年期间发表的文章。应用了纳入标准，对符合标准的 14 篇文章进行了定性分析，重点关注调查和教学实验结果。不同地理环境中的教练和体育教师表现出浓厚的兴趣来提高他们的知识，特别是在技术和心理领域。然而，他们承认自己的专业知识存在差距，常见的障碍包括语言和体育科学文献的复杂性。该评论还强调了学科知识与教学策略相结合的普遍差距。研究得出的结论是，虽然教练和体育教师渴望专业发展，但系统性障碍阻碍了他们的进步。需要更多可获得且与具体情况相关的专业发展机会。该评论强调了体育教师教育整体方法的重要性，强调教学技能和学科知识，以有效丰富教育过程。

关键词：专业知识；体育教练；体育教育，专业发展。

Abstract. *The effectiveness of sport coaches and physical education (PE) teachers is predicated on their professional knowledge and development. This narrative review examines the self-assessment of professional knowledge among coaches and PE-teachers, exploring their interest in professional development and the barriers they face. A literature search was conducted in English and Russian, focusing on articles published between 2016-2024. Inclusion criteria were applied, resulting in a qualitative analysis of 14 articles that met the criteria, focusing on survey and pedagogical experiment results. Coaches and PE-teachers across different geographical contexts demonstrated a keen interest in enhancing*

their knowledge, particularly in technical and psychological domains. However, they acknowledged gaps in their professional knowledge, with common barriers including language and the complexity of sport science literature. The review also highlighted a prevalent gap in the integration of subject matter knowledge with pedagogical strategies. The study concludes that while coaches and PE-teachers are eager to develop professionally, systemic barriers impede their progress. There is a need for more accessible and contextually relevant professional development opportunities. The review underscores the importance of a holistic approach to PE-teacher education, emphasizing both pedagogical skills and subject-specific knowledge to enrich the educational process effectively.

Keywords: *professional knowledge; sports coaching; physical education, professional development.*

Introduction. Sport coaches and PE-teachers are key architects of training and educational processes. Achieving professional goals in PE and sports requires specific competencies that combine knowledge, skills, and experience.

The professional knowledge base required of both sports coaches and school PE-teachers is extensive and multidisciplinary. It encompasses a range of expertise, including medico-biological, psychological, social, pedagogical, and administrative knowledge. A distinction exists in the emphasis each professional places on these areas based on their specific objectives. While both professionals share a common foundation in knowledge, their areas of concentration diverge to meet the unique demands of their roles. Sports coaches concentrate on the physiological advancement of athletes, whereas PE-teachers prioritize the holistic educational experience that shapes students' physical, social, and cognitive development.

Thus, in order to successfully perform their professional activities, sports coaches and PE-teachers must possess a wide variety of professional knowledge. This actualizes the problem of identifying the weaknesses in the professional training of sports coaches and PE-teachers. Therefore, the purpose of the research is to identify which professional knowledge and skills are lacking that sports coaches and PE-teachers encounter in the course of their professional activities.

Material & methods. This research takes the form of narrative review. The literature search was implemented in English and Russian from the database Google Scholar. The keywords used for this research were professional knowledge, sports coach, PE-teacher, content knowledge, professional development. Further inclusion criteria were applied to review were following: year of publication (2016-2024); original research; full text available. A first reading of the 98 papers resulting from this literature search (74 in English and 24 in Russian) led to retain only those that were specifically concerned with the general topic of the research and included the results of survey or pedagogical experiment. Thus, out

of the initial 98 articles, only 14 (12 in English and 2 in Russian) were found to meet all the inclusion criteria (Table 1).

Table 1

Articles included in the narrative review

Country	Participant - PE-teachers		Participant - Sports Coaches	
	References	Sample of the research	References	Sample of the research
USA	Todd et al., 2016.	51 PE-teachers; average age 40.92 years	Hegarty et al., 2018	253 participants with 14 (±10.4) years of coaching experience
Italy	Tul et al., 2019.	484 PE-teachers (338 had been teaching more than 20 years; 68 - from 11 to 20 years; 68 - up to 10 years)	-	-
Sweden	Ferry, 2018.	224 students enrolled in the PETE program at a major university	-	-
Netherland	-	-	Brink et al. 2018	75 football coaches (age: 50.0±10.1 years with 24.3±7.0 years of coaching experience
England	Herold & Waring, 2017	12 students studied on a one-year post-graduate PETE program	Stodter & Cushion., 2019	8 youth soccer coaches (age: 27.0±3.4 years)
Turkish	-	-	Kilic & Ince., 2015	343 coaches from diverse sports and coaching levels working in Ankara.
Belarus	-	-	Yermalovich., 2020	160 coaches from diverse sports and coaching levels
Russia	-	-	Starchenko., 2018	30 track and field coaches, ages and experience levels were not mentioned
China	-	-	He et al., 2018	80 coaches from diverse sports and coaching levels

Malaysia	Eng et al. 2016	94 PE-teachers (86.1% had 1-3 years of teaching experience, and 13.9% had more than 3 years of experience).	-	-
South Africa	-	-	Krkeljas et al., 2017	22 coaches from diverse sports and coaching levels

A thorough analysis of the data from the articles allowed the identification of common difficulties faced by PE and sports specialists in all countries, as well as difficulties characteristic of specialists from individual countries or specific areas: sport coaching and PE teaching.

Results and Discussion. The self-assessment of professional knowledge by coaches and PE-teachers from diverse geographical contexts was examined through a comprehensive analysis of questionnaires.

The surveys indicate a keen interest among coaches in various specialized areas. Turkish coaches, as reported by Kilic K. and Ince M. L. show a significant inclination towards seeking new ideas, particularly in sports-specific drills, mental training, and fitness conditioning [8]. Similarly, Dutch coaches, according to Brink et al. express a desire to deepen their knowledge in mental skills, physical skills, group dynamics, monitoring load and capacity, and talent development [1]. This suggests a widespread interest in enhancing both the technical and the psychological aspects of coaching.

Despite the high interest in certain areas, coaches from different countries acknowledge gaps in their professional knowledge. For instance, Chinese coaches, as investigated by He et al. recognize the need for a more formal educational approach, e specially in sport psychology [7]. South African coaches, according to Krkeljas et al. lack specific knowledge in sport science concepts such as VO2max testing and muscle soreness causes [9]. According survey of Brink et al. Dutch coaches also perceive their knowledge on physical and mental skills as lower compared to their technical and tactical knowledge [1].

The surveys reveal several common barriers faced by coaches across different countries. Language barriers, as highlighted by He et al. for Chinese coaches, limit access to international information and resources [7]. Additionally, the use of technical language in sport science literature and a communication gap between sport scientists and practitioners, as reported by Krkeljas et al. hinder the transfer of knowledge to the field [9]. Financial constraints and difficulties in finding and transferring knowledge, as noted by Kilic K. and Ince M. L. also pose significant challenges [8]

Yermalovich O.O. studied the significance of knowledge, skills, and competencies among 160 Belarusian coaches. Using the educational standard for Sports-Pedagogical Activity, coaches evaluated competencies on a 10-point scale. The lowest preparedness ratings were for genetics, philosophy, foreign language, biochemistry, and process management. The most "problematic" components with significant gaps between required and actual preparedness included foreign language skills, biochemistry, biomechanics, information technologies, scientific research, genetics, and process management. [4].

Interesting data were obtained by Starchenko V.N. and Metelitsa A.N. During the survey of 30 Russian coaches, the authors found that there is no correlation between the level of professional knowledge formation and the experience of professional activity of the coaches [13]. The relatively small sample size of the study does not allow for extrapolating the findings to the dynamics of the professional development of all coaches in Russia. However, the significance of the study lies in identifying an area of concern for further research. How does the structure and content of coaches' professional knowledge change throughout their professional activity? It is clear that the theoretical foundation of coaches is formed during their professional education within the framework of higher education. Further refinement of this knowledge base is carried out through the self-education of coaches and their participation in qualification improvement courses. But what should be the volume and content of the theoretical (university) knowledge base of coaches so that they can confidently feel secure in the further refinement of their knowledge and competencies? Is there a risk that a meager (or irrelevant) theoretical foundation may become a significant barrier to the further self-improvement of coaches? These questions are relevant direction for the future scientific research in this area.

Hence, the questionnaire results reveal a global trend among coaches: a strong desire for professional development across technical and psychological domains. Despite their enthusiasm, coaches consistently encounter barriers such as language limitations and complex scientific literature. These challenges hinder knowledge acquisition, highlighting the need for more accessible and contextually relevant professional development opportunities.

With the aim of understanding the current state of PE-teacher education and practice globally, a series of surveys have been conducted across various countries. By examining the attitudes, perceived barriers, and professional competencies of PE-teachers, this review seeks to uncover the multifaceted nature of their educational roles and the implications for enhancing PE-teacher education programs.

In study of Ferry M. data from a web-based questionnaire completed by 224 PSTs enrolled in a PETE program at a major Swedish university were used [5]. The questionnaire was designed to capture the preservice teachers (PSTs) experi-

ences, views, beliefs, and perceptions of PE and the PE profession. The findings reveal that PE PSTs are a relatively homogeneous group with similar backgrounds, experiences, and perceptions. They believe that a good PE-teacher should possess subject knowledge, pedagogical competence, and be considerate. They also think that a good PE lesson should be fun, inspiring, physically active, and adaptable to all students. The PSTs identified developing pupils' character and promoting healthy behaviors as important goals for PE. At the same time, it is important to noted that during the questionnaire PSTs did not mention the importance of knowledge about their students. Another vital aspect which was not mentioned by preservice teachers is philosophical aspect. It seems that novel teacher so concentrated om the question "How to teach (or how to form this qualities and abilities)?" that they forgot about the question "Why teach (or why form specific qualities and abilities?)". But the last question is as important as the first.

Concentration on the pedagogical aspect (how to teach) with losing from the view the substantial aspect (what to teach) and philosophical aspect (why teach?) is common tendency. So, the study of Romar J.E., Åström P. and Ferry, M. found that pre-service PEH teachers' practical knowledge was mainly pedagogical, with a focus on instructional strategies [11]. This suggests that these teachers are particularly concerned with how to teach, rather than the subject matter itself. Also here was a noted lack of focus on curriculum aims and contextual issues related to school and society within the preservice teachers' practical knowledge. This could imply a gap in their understanding of the broader educational context and its relation to PE.

This problem goes beyond area of PE and concerns education itself. So, Shulman L.S. in his famous article "Those Who Understand: Knowledge Growth in Teaching" argues that historically, teacher assessments have primarily focused on subject matter knowledge, with a smaller emphasis on pedagogical skills [12]. However, he notes a shift in the 1980s towards a greater focus on pedagogical competencies in teacher evaluations, which often do not map onto the content of the curriculum. He refers to this as the "missing paradigm" problem, where research and policy have overlooked the importance of subject matter in teaching effectiveness.

Shulman L.S. further emphasizes the importance of content knowledge for teachers, stating that "Mere content knowledge is likely to be as useless pedagogically as content-free skill. But to blend properly the two aspects of a teacher's capacities requires that we pay as much attention to the content aspects of teaching as we have recently devoted to the elements of teaching process" [12].

For a PE-teacher, this means that while understanding how to teach (pedagogical knowledge) is crucial, it should not come at the expense of deep knowledge of the subject matter (content knowledge). A PE-teacher needs to have a strong grasp

of PE concepts, sports techniques, human anatomy, and physiology to effectively teach and inspire students. Without this foundational knowledge, the teacher's ability to make informed decisions about what and how to teach is compromised.

Empirical justification of this words could be date which were got by Herold F. and Waring M. during the experimental study which include survey of 12 pre-service teachers (PSTs) who were studying in a one-year post-graduate PE-teacher education (PETE) program at a university in the UK [7]. The PETE program was 36 weeks long, with 24 weeks of school-based learning and 12 weeks of university-based learning. The school-based learning involved practical teaching experiences with feedback and mentoring, while the university-based com-ponent included lectures, seminars, workshops, and sessions on general education and pedagogy.

The article emphasizes the importance of content knowledge for PE-teachers. It suggests that having a strong understanding of the activities they teach can positively influence their teaching strategies and confidence. A clear link between the depth of content knowledge and the confidence level of PE-teachers were discovered. At the same time author emphasize that content knowledge alone is not enough for effective teaching. They need to combine it with pedagogical content knowledge (PCK), curricular knowledge, and general pedagogical knowledge.

The PE-teacher who have deep theoretical knowledge about their professional activity could teach not only PE-lessons, but also theoretical lessons connected with PE and sport. For instance, in some Malaysian Secondary Schools there are such subject like "Sport Science". Eng H. et all investigated attitude and Perceived Barriers to Implementation of Sport Science Program in Malaysian Secondary Schools [3]. According results of their questionary among 94 teachers from Malaysia about 65% felt poorly prepared to teach sport science. At the same time teachers generally had a positive attitude towards teaching sport science, with 90% agreeing that they liked teaching the subject. Hence, results of this survey point out the luck of professional theoretical knowledge of PE-teacher.

A study of 484 Italian PE-teachers identified 13 key competence areas, with factor analysis revealing didactic approaches as the most significant factor (31.3% of variance). While teachers demonstrated strength in teaching methods, they reported notable weaknesses in areas such as ICT, foreign language communication, research skills, and incorporating contemporary sports activities. The research highlighted the complexity of PE-teachers' professional competencies and the need for comprehensive professional development [16]

In synthesizing the findings from a global perspective on PE-teacher education and practice, it is evident that the pedagogical landscape is rich with complexities and nuances. The most salient takeaway from this review is the imperative balance between pedagogical skills and content knowledge in PE-teacher education. While

the former equips teachers with the 'how' of instruction, the latter provides the 'what' and 'why'—essential components that inform and enrich the educational process.

The studies reviewed here underscore the need for PE-teachers to possess a robust understanding of PE concepts, sports techniques, and the physiological aspects of physical activity. This foundational knowledge is not only crucial for effective teaching but also for inspiring and motivating students to engage in lifelong physical activity and healthful behaviors.

However, the review also reveals a prevalent gap in the integration of subject matter knowledge with pedagogical strategies, suggesting a need for a more holistic approach in PE-teacher education programs. This calls for curricula that not only focus on teaching methodologies but also emphasize the importance of subject-specific knowledge and its application in the classroom.

Conclusions. This narrative review identifies significant knowledge gaps among sport coaches and physical education (PE) teachers worldwide. Both are dedicated to improving their technical and psychological skills but face barriers like language issues, limited sport science resources, and financial constraints. Sport coaches seek advancement in areas such as drills, mental training, and talent development but often lack expertise in sport psychology, biomechanics, and genetics, highlighting the need for accessible training programs. Similarly, PE-teachers aim to enhance their pedagogical methods and subject knowledge but struggle with curriculum integration, sport science, and ICT use. A balanced, integrated approach to professional development is essential to address these gaps and support high-quality sports and physical education.

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虚拟博物馆作为对幼儿园教师进行系统支持的手段
VIRTUAL MUSEUM AS A MEAN OF METHODICAL SUPPORT FOR PRESCHOOL TEACHERS

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摘要。本文探讨了创建专门介绍国内学前教育史的虚拟博物馆的算法，在此基础上为学前教师提供方法支持，以确保他们的专业活动符合俄罗斯联邦学前教育联邦教育计划以及俄罗斯联邦学前教育联邦教育标准。

关键词：虚拟博物馆、方法支持、学前教育、启蒙、教师。

Abstract. *The article examines the algorithm for creating a virtual museum dedicated to the history of domestic preschool pedagogy, on the basis of which methodological support will be provided to preschool teachers to ensure that their professional activities comply with the Federal Educational Program for Preschool Education, as well as the Federal Educational Standard for Preschool Education in the Russian Federation.*

Keywords: *virtual museum, methodological support, preschool education, enlightenment, teachers.*

A virtual museum is one of the most promising areas of educational and outreach activities at the present stage of society development. In recent years, high-speed Internet has become available almost throughout the entire territory of the Russian Federation. This opens up new opportunities and access to mastering information on a topic of interest almost at any time and from anywhere in the country. The concept of a virtual museum is actively entering the socio-cultural space of modern society, including the professional space of teachers at various levels of education. Given the challenges of our time, virtualization of the museum space is becoming a very effective tool for education, as well as for providing methodological support to teachers.

The following features of a virtual museum are highlighted:

– physically such a museum does not exist, the museum is located on the Internet, is based on real exhibits, and has its own structure;

– you can visit the virtual museum at any time, there are no restrictions on the time you can stay in the museum to view exhibits;

– the museum allows you to preserve unique archival information, i.e. it removes the issue of preserving samples, while the space for preserving any information is practically unlimited;

– the museum and exhibition exposition itself is placed on the Internet. Its task is to show the visitor of the virtual museum here and now what he will not be able to see in another place (real or virtual);

– teaching staff of educational institutions can use museums to perform various functions: communicative, cultural and educational, training and motivational. Thanks to the virtual museum, virtual excursions, competitions and events for mastering the cultural heritage of the country and the world are possible [4]

It is also possible to derive and formulate some socio-cultural functions of virtual museums

1. Educational and enlightening function. Resources of virtual museums can be used in educational and enlightening activities. The content of the virtual museum to the needs of educational programs of school, university subjects, as well as to programs of additional education, including advanced training courses.

2. Communicative function. It consists of the ability to communicate with museum employees and other visitors, through chats and comments.

3. Spiritual and educational function. Focused on enriching the intellectual and spiritual baggage of society and obtaining an incentive for further development.

4. Social function. Ensuring free and equal access to museum exhibitions and exhibits regardless of the social, gender and age characteristics of visitors to the electronic resource via a hyperlink.

5. Mobilization function. Consists of motivating society to cognitive activity and education.

6. Entertainment function. This is a new opportunity that virtual museums present, in an entertaining and fairly free form to introduce the public to masterpieces of world art and museum exhibits [2]

7. Methodological support function. This is a special function, characteristic for the project we present.

Currently, there are different views on the term «methodological support» of teachers. N.Yu. Tkachuk characterizes it as «an operational and prospective response to the requests and needs of teachers by organizing continuous pedagogical education and general cultural development of teachers, the work of methodological associations of the preschool organization staff» [3].

The preschool education system in the Russian Federation is currently at a special stage of its development. Teachers face a huge number of challenges based on changes in both the regulatory framework and the rapid pace of development

of society as a whole. Improving professional competencies, adapting them to modern realities and demands are important tasks for teachers at all levels of education, including preschool.

At the moment, our professional ecosystem offers a fairly large number of options for developing your general and professional competencies: various advanced training courses, master classes held in person and online, webinars, etc. Preschool teachers share their developments on online wiki- format resources and in social networks.

One of the main problems of using these sources of information for one's professional activities is the low level of reliability of the materials and their compliance with the modern requirements of the Federal Educational Program for Preschool Education, as well as the Federal State Educational Standard for Preschool Education.

Also, when writing the part formed by the participants of the educational process, and when choosing the means and methods for implementing the educational program, many kindergartens are faced with the desire, and sometimes the need, to expand their professional views and study new methods and approaches to the implementation of educational activities in kindergarten.

Thus, it seems to us extremely useful to create a single interactive space, in our case a museum, consisting of encyclopedic, and therefore reliable and verified content, which can be used not only to educate preschool teachers, but will also be used to provide significant methodological support.

We propose to consider the design features of an interactive educational resource using the example of the architecture of an interactive museum dedicated to the history of preschool education in Russia.

When designing this museum, we relied on the idea of the triune goal of this project: educating teachers, providing methodological support, and creating an environment for professional communication based on innovative technologies, including artificial intelligence.

This site was developed on the basis of a popular web page builder. It is classified as a semi-closed multifunctional information site, which means that in order for a page visitor to be able to use all the functionality, he must register on this portal.

J. Jablonski identifies the following requirements for the design of graphical interfaces: the interface should be intuitive and easy to use; the color scheme should be comfortable for human perception; there should be no visual saturation.

The design of the graphical interface of the virtual museum on the history of preschool pedagogy was carried out according to the following algorithm:

1. A study that includes a stage of analysis of the open and closed market of virtual museums in this and related areas;

2. Prototyping. Visualization of the site structure, displaying the functionality and location of the main interface components.
3. Development of design solutions;
4. Filling the site with visual and text content.

The title page includes the title and navigation header for more convenient transition to thematic sections, as well as a field for registration of visitors. It is worth noting that registration is not mandatory, however, with a linear and sequential passage and study of materials, when performing some interactive tasks located on this site, the teacher receives a certain number of points for the activity shown, and later a certificate confirming his participation in various types of activities on this portal.

As we said above, one of the tasks set before us is the education of workers in the preschool education system. In the section that is now on your screen, the visitor can get acquainted with outstanding figures in pedagogy in Russia, and learn not only the specifics of their pedagogical ideas, but also get acquainted with their biographies in order to learn how and what historical-political, as well as personal events influenced their pedagogical views.

The second task that we set for ourselves is to provide preschool teachers with the opportunity to use specific methodological and didactic materials that were proposed by these historical figures for work in a modern kindergarten. For this purpose, all materials are distributed by educational areas and in each section there is a so-called «bank» of ready-made materials that can be downloaded, printed and used in the implementation of educational activities.

The last section of our portal includes a space for professional communication of preschool teachers. Here, in addition to fairly classic forms of interaction, such as «master class», interactive quests, wiki section, where visitors can post materials they have already developed, compiled using information posted on the site, there are sections that actively use innovative communication technologies, namely “artificial intelligence” and GPT chat , based, accordingly, also on artificial intelligence. These resources will be aimed at helping to create unique materials in text and visual format based on the ideas of great Russian teachers for their further use in work in kindergarten.

Thus, we believe that this virtual educational project will combine several functions on education, enlightenment of preschool teachers, as well as on providing methodological support for their professional activities, which will be extremely useful and convenient to use not only in the usual activities of preschool teachers, but also in organizing their advanced training.

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学校人格发展教育环境是初中生成功人格发展的一个因素
PERSONALITY-DEVELOPING EDUCATIONAL ENVIRONMENT OF THE SCHOOL AS A FACTOR FOR THE DEVELOPMENT OF A SUCCESSFUL PERSONALITY OF A JUNIOR SCHOOL STUDENT

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摘要。本文对国内现代心理学和教育学对小学生教育环境人格发展潜力的研究成果进行了科学综述。分析了被视为小学生人格发展重要因素的教育环境类型。指出，为了优化教育环境对小学生人格发展的影响，建议改造教育环境的心理教育和社会成分。

关键词：学校教育环境，人格发展型学校教育环境，人格发展，小学生。

Abstract. *The article presents the results of a scientific review of modern domestic psychological and pedagogical studies of the personality-developing potential of the educational environment for primary school students. The types of educational environments considered as a significant factor in the development of the personality of primary school students are analyzed. It is noted that in order to optimize the personality-developing impact of educational environments on primary school students, it is proposed to transform the psychodidactic and social components of the educational environment.*

Keywords: *educational environment of the school, personality-developing educational environment of the school, personality development, primary school student.*

In a modern school, starting from grades 1–4, two fundamental concepts are distinguished: gifted children and gifted children. In any case, teachers distinguish certain groups of children who are significantly ahead of their peers in their development. For their optimal development in the educational environment of the school, it is necessary to create conditions that can lead a gifted child to a

high-quality manifestation of his extraordinary abilities, the manifestation of his genetically inherent potential and the creation of opportunities for the manifestation of outstanding achievements in the future. It is noteworthy that the relatively recent concept of the educational environment is considered in almost all fields of knowledge. In the logic of our study, we will consider it in the psychological and pedagogical aspect. The practice of its design in the system of developmental education shows that the educational environment in this context means the process of life of a specific educational institution (A. A. Veryaev, T. A. Osipova, I. K. Shalaev, etc.). Researchers confirm this thesis by the presence of spatial-subject, material and social-personal components. In this regard, T. P. Belikova emphasizes the importance of the influence of the educational environment, and especially its microenvironment (social groups, communities, public organizations, etc. formed in it), on the process of formation and development of the child's personality, mutual complementarity and mutual enrichment. O. S. Gazman, in contrast to the technological approach, believes that the educational environment of primary school is a real psychological and pedagogical world, a unification of cultural and educational traditions that have already developed over time, personal influences of teachers, children and their parents, specially organized situations aimed at creating the inner world of students and conditions for the development of the child's personality. We will consider the system of concepts:

Environment - a set of existing and specially created conditions that form a complex structure external to a person, influencing him and activating his activity.

Educational environment is an environment that is a means of developing a child's personality, providing an opportunity for a student to self-determine, self-actualize, and through the organization of various types of activity to stimulate students to recognize themselves as subjects of education.

The peculiarity of our approach is that we consider the educational environment of the school as the main one, which includes specific environments: educational, informational, communicative, intellectual. The educational environment without specially built-in corresponding pedagogical systems does not give a sufficient effect. This issue was specifically considered by us in one of the works [8]. The specific environment - a component of the educational environment - must be represented by a pedagogical system. In a modern school, starting from grades 1-4, two fundamental concepts are distinguished: gifted children and gifted children. In any case, teachers distinguish certain groups of children who are significantly ahead of their peers in their development. For their optimal development in the educational environment of the school, it is necessary to create conditions that can lead a gifted child to a high-quality manifestation of his extraordinary abilities, the manifestation of his genetically embedded potential and the creation of opportunities for the manifestation of outstanding achievements in the future. N. S.

Leites defines three categories of gifted children: with an early manifestation of giftedness, with a bright manifestation of abilities in various types of giftedness, with acceptable signs of giftedness. All these categories of students require not only an individual pedagogical approach, but also an appropriate educational environment, which is an important factor in increasing the productivity and development of giftedness of a primary school student [2, p. 86]. It is noteworthy that the relatively recent concept of the educational environment is considered in almost all fields of knowledge. In the logic of our study, we will consider it in the psychological and pedagogical aspect. The practice of its design in the system of developmental education shows that the educational environment in this context means the process of life of a specific educational institution (A. A. Veryaev, T. A. Osipova, I. K. Shalaev, etc.). Researchers confirm this thesis by the presence of spatial-subject, material and social-personal components. In this regard, T. P. Belikova emphasizes the importance of the influence of the educational environment, and especially its microenvironment (social groups, communities, public organizations, etc. formed in it), on the process of formation and development of the child's personality, mutual complementarity and mutual enrichment of each other. O. S. Gazman, in contrast to the technological approach, believes that the educational environment of primary school is a real psychological and pedagogical world, a combination of cultural and educational traditions that have already developed over time, personal influences of teachers, children and their parents, specially organized situations aimed at creating the inner world of students and conditions for the development of the child's personality. Psychologists suggest considering the educational environment of the primary education system from the standpoint of the general range of conditions that a child finds in the school reality surrounding him both inside and outside the school (internal and external environment).Thus, many scientists consider it as: - part of the socio-cultural space created for personal interaction between children and adults (N. B. Krylova); - as an environment where a primary school student acquires the first experiences of socialization and the opportunity to demonstrate his abilities (G. Yu. Belyaev); - a set of factors influencing the expansion of psychological, social, spatial-subject and interpersonal components of the development of students (N. A. Spichko). In pedagogical science, the concept of "educational environment" has become widespread and is quite actively studied in various aspects. For example, I. G. Shendrik believes that the educational environment is the environment of a schoolchild and the conditions under which he can interact with this environment, and specially organized pedagogical activity in order to create conditions for the self-realization of the child's personality is an opportunity for the child to understand and cognize this environment, since it contains the prototypes of culture and education [6, p. 84]. The educational environment must be purposefully designed to meet the tasks

that are set for primary school by the social order of society, asserts V. I. Slobodchikov, and the content and practice of primary school must have a formative effect on the child and generate in him a desire to improve and develop his abilities. The researcher believes that the characteristic features of a developing educational environment are the coordination of actions of all participants in the educational process, educational programs, the content of the teaching and upbringing process, and the appropriate level of training of teachers and management personnel. From the works of V. V. Davydov on primary general education, in turn, it is possible to group the main tasks of the educational environment of the school, adequate to the needs of the personal development of gifted children. These include the formulation of the following tasks: Organization of the educational environment for students in elementary grades, which creates conditions for the formation of competencies related to self-realization and self-development of the child. Ensuring effective mastery of the main educational program and educational success for each child at their level. Creation of an open and socially significant way of functioning of the primary school, integrated into the classroom, extracurricular and extracurricular activities of children. We accept the position of V.V. Kraevsky, who does not see contradictions in subject-object and subject-subject relations, and believes that when the goal is set to form a student's position as a subject of educational activity, he acts as an object of the teacher's pedagogical influences aimed at achieving this goal. A student cannot act only as a subject in all the diversity of pedagogical relations. The teacher is assigned the function of pedagogical guidance.By constantly creating various situations that stimulate and form the cognitive independence of schoolchildren, the teacher makes the threads of pedagogical guidance barely noticeable, imperceptible. But these threads always exist. In other words, in order for a schoolchild to form a position of a subject, he must first be made an object, i.e. the subject-subject relationship considered from a pedagogical perspective exists within the subject-object relationship, it is determined and stimulated by it [4]. For any pedagogical system, the relationship of subject-object and subject-subject relationships between participants in the educational process is a rather complex issue. The structure of the pedagogical system we are creating with the principle of individual trajectories embedded in it requires different concentrations of certain relationships at each level. This issue should be considered separately, outlining your position. Subject-object and subject-subject relationships are built in the process of influence and interaction of persons participating in communication. We will consider influence as an action directed at someone, at something, with the aim of achieving something, inspiring something, and interaction as a process of direct or indirect influence of subjects on each other, generating their mutually conditioned connection. Pedagogical influence has most often been considered in the context of an authoritarian style of managing the learning pro-

cess. In modern concepts, the emphasis is on interaction, which is based on the joint activity of teachers and students who are equally interested in high results of joint work. The essence of such interaction consists in the direct or indirect influence of the subjects of the educational process on each other, generating a mutual connection. In any case, it is the joint activity that is the cause of the interaction between the participants in the learning process. We consider pedagogical interaction as the most important condition for the existence of the environment, on the one hand, and on the other, as a higher level of relations between the subjects of the pedagogical system compared to influence. In the process of building an intellectual environment, it is necessary to consider direct influence, directly aimed at the student, and indirect, mediated, carried out through a reference person or group.

Thus, it is the educational environment that allows creating conditions for the personal development and self-development of the child, acts as a consultative center for parents of gifted children, and acts as a general background for the development of their intellectual, physical and creative potential. The speed and productivity of the process of developing the personality of a gifted junior schoolchild are determined by the possibilities and pedagogical conditions of the educational environment of the primary school.

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利用互联网资源准备 TRFL
USING INTERNET RESOURCES IN PREPARATION FOR THE TRFL

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注释。互联网资源是组织 RFL 培训的有效工具。通过在学习过程中使用电子资源，外国学生可以更成功地准备俄语作为外语 （TRFL） 的考试。还值得注意的是，互联网资源是学生自学考试的良好学习工具。

本文致力于利用互联网资源帮助外国学生通过 TRFL。本文简要概述了可用于帮助教师和外国学生准备考试的互联网资源。所提供的资源是免费的，可供用户使用。

关键词：TRFL、俄语作为外语、测试、子测试、考试准备、互联网资源。

Annotation. *Internet resources are an effective tool in organizing RFL training. Preparing foreign students to take testing in Russian as a foreign language (TRFL) can be more successful through the use of electronic resources in the learning process. It is also worth noting that Internet resources are good learning tools for self-preparing students for exams.*

This article is devoted to the use of Internet resources to prepare foreign students for passing the TRFL. The article provides a brief overview of Internet resources that can be used to help teachers and foreign students prepare for exams. The resources presented are free and available to users.

Keywords: *TRFL, Russian as a foreign language, test, subtest, exam preparation, Internet resources.*

The testing system allows for an objective and independent assessment of students' knowledge. It is an important component in the field of teaching Russian as a foreign language (RFL) in order to determine the level of Russian language proficiency of foreign students [Loyberg: 2018]. TORFL ("Testing of Russian as a Foreign Language)" is a complex exam that requires special preparation. To prepare for the TRFL exam for any level, a comprehensive and systematic approach is needed. It should also be said that TORFL can be taken not only in Russia, but also in many countries around the world. In order to successfully prepare for cer-

tification exams in the Russian language, especially in the absence of a language environment, we suggest using various Internet resources. The resources can be used both for independent preparation of students and directly in the classes themselves. Testing in RFL is aimed at determining the level of language proficiency in general, as well as in a specific type of speech activity, identifying the abilities for a certain type of speech activity. Along with this, the exam helps to identify difficulties in mastering a particular type of speech activity [3].

The TORFL (The Test of Russian as a Foreign Language) exam or TORFL was created in 1994 to determine the level of proficiency in Russian as a foreign language. TORFL is a standardized test for determining the level of proficiency in Russian recognized in a number of countries. TRKI is a system of state exams that confirm the level of proficiency in Russian as a foreign language in accordance with the Common European Framework of Reference (CEFR).

The exam allows you to confirm proficiency in Russian as a foreign language at one of six international levels from A1 to C2. After successfully passing the test, foreign students receive an international TORFL certificate, which confirms a certain level of proficiency in Russian as a foreign language. Today, TRKI is considered the most important exam among foreigners who want to confirm their level of proficiency in a foreign language.

The exam includes 6 levels: elementary, basic, I certification, II certification, III certification, IV certification. The test consists of 5 components (subtests), each of which is aimed at checking a certain type of speech activity. These are such components as “Vocabulary. Grammar”, “Reading”, “Listening”, “Speaking” and “Writing”. The complexity and duration of each part of the exam depends on the level of the exam being taken [Tarchimaeva: 2013: 252-256]. According to statistics, the most difficult part of the exam is the productive types of speech activity - “Speaking” and “Writing”.

In this article, we will consider free, accessible electronic resources for preparing for the TORFL for different levels of training of foreign students.

To begin with, it is important to familiarize foreign students with the structure of the work and the main requirements for the exam, the assessment scale, preparation strategies, the time allotted for completing the tasks. Samples of tasks for the TORFL are available on the website of the State Institute of the Russian Language named after A.S. Pushkin (https://www.pushkin.institute/certificates/cct/tests-online/), (https://testingcenter.spbu.ru/en/exams/russian/torfl.html), at Moscow State Linguistic University (https://trki.linguanet.ru/testirovanie-po-urovnyam-trki-a1-s2/). We also suggest using the YouTube channel of St. Petersburg State University (https://www.youtube.com/@torflspbu1042), one of the playlists of which is directly dedicated to preparation for the TORFL exam. To prepare for the vocabulary and grammar subtest, we recommend using the website of the Rus-

sian Language Training Center of Moscow State University (https://mgu-russian.com/ru/learn/test-online/), which presents lexical and grammar tests for different levels of language proficiency. The tests contain multiple choice tasks. When completing the task, you must choose the correct answer from 3 proposed ones. The completed tasks are checked automatically.

On the website "TORFL 4 online preparation" (https://www.malingenie.com/russian-c2-vocabulary-tests/#) you can find various practice tests and tasks to prepare for the fourth certification level. The blog provides useful recommendations for preparing for the exam.

The website of the Far Eastern Federal University presents electronic manuals for preparing for exams of I, II and III certification levels of general proficiency in Russian (https://www.dvfu.ru/education/online-training/foreign-students/manual-on-test-preparation-general-knowledge-of-russian-language/). The tasks help prepare for all five subtests of the exam. Self-test keys are also included.

The website of the Main Center for Testing Foreign Citizens of Lomonosov Moscow State University contains materials for preparing for testing. There you can find tests for all 6 levels, as well as state standards for RFL for each level of language proficiency (https://gct.msu.ru/podgotovka-k-testirovaniju/).

The Open Education website has a course called "Preparation for TORFL. Level B1" (https://openedu.ru/course/spbu/TORFL_B1/ session=self_paced_2022). This course allows you to prepare for all subtests of the 1st certification level. Some of the materials are absolutely free for users, you only need to register for the course.

Thus, in this article we have reviewed the available electronic resources that help in preparing for TORFL. These resources can be used for independent work of foreign students, as well as during classroom work.

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阿瓦尔微地名学构成中的地名学元素
ANTHROPONYMIC ELEMENTS IN THE COMPOSITION AVAR MICROTOPONYMY

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摘要。地名在阿瓦尔语的词汇系统中占有特殊地位。很难高估阿瓦尔地名的口头解释对整个达吉斯坦的重要性。微地名学领域，一个人以多种形式出现——作为个人（个性）、作为家庭和整个农村社会的成员、作为一个民族的代表——开始于房屋-院落综合体的范围之外，这是在周围空间定居的起点。本文确定了用于命名定居点边界内地形对象的地名单元中的人类名元素；确定了这些类型的地名的具体实现具有在不同的语言层面上确定的许多特殊特征——词汇语义、名词、结构、语法、语言文化。这项工作的相关性还归因于地名的这一领域尚未受到特别关注。

关键词：阿瓦尔语、阿瓦尔地名、微地名、语义学、人名、人名元素、称谓。

Abstract*. Toponyms occupy a special place in the lexical system of the Avar language. It is difficult to overestimate the importance of the oral interpretation of Avar toponyms for Dagestan as a whole. The field of microtoponymy, in which a person appears in several guises – as an individual (personality), as a member of a family and the entire rural society, as a representative of an ethnic group – begins beyond the limits of the house -yard complex, which is the starting point for settling in the surrounding space. The article identifies anthroponymic elements in the onym units used to name topographic objects within the boundaries of a settlement; it is established that the specific implementation of these types of onyms is characterized by a number of special features identified at different linguistic levels - lexico–semantic, nominational, structural, grammatical, linguocultural. The relevance of the work is also due to the fact that this sector of toponyms has not yet been subjected to special consideration.*

Keywords: *Avar language, Avar toponymy, microtoponyms, semantics, anthroponyms, anthroponymic elements, appellative.*

The article examines the anthroponymic vocabulary and analyzes the ways of its verbalization on toponymic material. The object of the study is the toponyms of Dagestan districts, which represent all dialects of the northern dialect of the Avar language. In the names of toponyms on the territory of the Gergebilsky, Gumbetovsky, Kazbekovsky and Khunzakhsky districts of Dagestan, both specific semantic meanings and figurative representations of the people have been fixed. Toponyms reflect not only the feature of the object, but also the attitude of the nominating people to the area, their beliefs, customs and traditions. Many microtoponyms can be found in Avar villages. Not only fields, meadows, forests and mountains have names, but also a path, a spring, etc. A variety of names have been recorded in the territory of residence of the Avars, which give an idea of the life of the highlanders. The analysis of the Avar anthroponymicon has shown that this is a complex, multi-layered phenomenon. It was formed in peculiar historical, geographical and linguistic conditions, in close connection with the issues of ethno-genesis and ethnic history of the Avar people. The concept of "microtoponymy" in the meaning of toponymic microsystem and microtoponym has appeared in scientific literature since the 1960s. Some researchers consider the names of land plots to be microtoponyms - khurzal "fields", sagabi "pastures", rokhyal "tracts", kulabi "farms", akhal "gardens", etc. For example, you can find such micro-toponyms that reflect the surrounding geographical objects, and their traces of activity in a given area, and the names of those who worked or are the owner of a certain area [3:184-186]: *ГIачинух* [giachinukh] "The road along which cows walk", *Базáргазул нух* [bazargazul nuh] "The road along which merchants walk", *ГIуру́с нух* [gurus nuh] "Russian road//Wide road", *Гъóркьа рóсулъе нух* [gyorkya rosulye nuh] "The road to the lower sea", *ГIелу́н ккурá гамáчI* [gelun kkura gamachI] "Stone, u who was caught by Elune" [5], etc.

Microtoponyms are a good source for identifying currently used or obsolete personal names. And, conversely, anthroponyms served as the basis for the replenishment of geographical names. This fully applies both to the area inhabited by Avars, such as the Gergebil, Gumbetovsky, Kazbekov and Khunzakh districts, as well as the territories of residence of other nationalities. Two main subcategories of anthropological understandings are distinguished – patronomic and memorial understandings.

1. Patronymic toponyms arose on the basis of names, landowners and other categories of people. According to microtoponyms, we find out that people whose names are not always clear to modern Avars were directly related to them. Very often on the founder//the host indicates the microtoponymic names, which include the components of the *кули* [kuli] "khutor", *ах* [ah] "garden", *гьасдан* [giasdan] "vegetable garden": *ДирмухIумил кули* [dirmukhiumil kuli] "Farm of Dirmukhuma", *ХIасáнил гьасдáн* [hasanil hasdan] "Garden of Hassan", *Шáгьасул гьасдáн*

[shagasul hasdan] “Garden of Shahava”, *БатIа́лил гьасда́н* [batIalil hasdan] “Garden of Batala”, *Сула́йманил гьасдан* [sulaimanil hasdan] “Garden of Sulaiman”, *ГIòдаса МахIа́ндил гьасда́н* [giòdasa mahiandil giasdan] “Garden of Muhammad from the village of Oboda”, *Алха́сил нохъò* [alhasil nohò] “Cave of Alhasa” [5] and many others. As you can see, many names are formed with some phonetic changes in the names or nicknames of their owners. In the areas under consideration, microtoponyms are most often found, which are formed from anthroponyms, used only in the genitive case [3: 184-186].

Toponyms with personal names at the base were brought to life by the development of new lands by private owners: *Исуйл кули* [isuil kuli] “Isu Farm”, *ХIаса́нил кули* [hasanil kuli] “Hasan Farm”, *МахIутIил кули* [makhiutiil kuli] “Mahuta Farm”, *Т1айгимил кули* [t1aigimil kuli] “Taygima Farm”, *Хайнзил рагIа́л* [hainzil ragal] “Edge/abyss of Hainz”, *СагIа́дол кула́л* [sagiadol kulal] “Hamlet of Saado”, *ИнахIажарил кули* [inahiazharil kuli] “Hamlet of Inahazhara” [5]. With the change of owners, such toponyms did not change, they were inherited. Those of the personal names that coincide with the literary form of the Avar language can easily be distinguished from the toponyms: *Шамсу́динил кули* [shamsudinil kuli], *ХIажил кули* [hiazhil kuli], *Зурпу́къанил кули* [zurpukanil kuli]. At the heart of most toponyms of personal names are used in the form in which they are used in everyday speech, and not in literary form [3:184-186]: *Ису́йл ШагIма́нил кула́л* [isuil shagimanil kulal], *Барянил кьури* [baryanil kyuri], *ИдирисмухIумил гьобò* [idirismukhiumil gyobò], *ГIобòдаса МахIа́нди гьобò* [giobòdasa mahIandi gyobò], *ГIалѐгил хурза́л* [gialegil khurzal], *Ха́йрил хурза́л* [khairil khurzal], *СагIа́дал хурза́л* [sagiadal khurzal], *ЦIахIиласул Эрбе́гьенил кули* [ciaxilasul erbegienil kuli], *Идирисул МухIу́шил хурзал* [idirisul muhiushil khurzal] (cf. full name Idrisil Mukh1amadil) [5] and many others. As you can see, a complex formation consisting of two or more personal names acts as a geographical name. In the first place in such a construction is the name of the owner of the object, the name of the grandfather, great-grandfather is placed in front of it.

2. Memorial toponyms is given in memory of someone or something [7: 163; 2: 101; 1: 22]. It comes from Latin. memorialis “memorable, in memory of someone, of anything.” This group of geographic names is derived from the personal names and surnames of individuals known in various spheres of human activity. They perpetuate the names of outstanding or simply famous people – teachers, scientists, political figures.

The main features characterizing them are: 1) hagiotoponim is a toponym formed from any hagionym, i.e. saint. Grave graves of saints) [4: 136]: *Г1ободиясул (с.г1.с.) хоб* [g1obodiyasul (s.g1.s.) hob] “Tomb of Saint Obodiyav”, *Муса шайхасул хоб (Абумуслимил наслуялъул чи)* [musa shaikhasul hob (abumuslimil nasluyalul chi)] “Place of pilgrimage//ziyarat Sheikh Musa”;

Дибирасул хъуба [dibirasul khuba] “Place of pilgrimage// ziyarat Dibira”, *Шайихасул зиярат* [shayihasul ziyarat] “Place of pilgrimage//ziyarat Shabanqadi”, *МухIамад шайхасул зиярат* [muhiamad shaykhasul ziyarat] “Place of pilgrimage//ziyarat Sheikh Muhamad” [5]; 2) “there is a tendency to attach increased importance to the form, which is due to the general heightened mood and enthusiasm of the era” [6: 327-328], after the death of famous political figures, oikonyms appear in order to perpetuate his name, such as the *Колхоз имени Ленина* “Lenin Collective Farm”, *Колхоз имени Сталина* “the Stalin Collective Farm”, *Колхоз имени Коминтерна* the Comintern Collective Farm, *Колхоз имени Хизроева* “the Khizroev Collective Farm” [5].

In the Avar regions of Dagestan, some microtoponyms are used in parallel with the native Avar quarter names. Street names are indicated and pronounced in Russian, as they are new names: *Почтовая* Pochtovaya, *Гоголя* Gogol, *Есенина* Yesenin, *Пушкина* Pushkin, *Школьная* School, *Ореховая* Orekhovaya, *Трансляционная* Translational, *Береговая* Beregovaya, *Имама Шамиля* Imam Shamil, *Карьерная* Quarry, *Надскальная* Nadskalnaya, *Центральная, Тупиковая* Central, Dead-end, *Расула Магомедова* Rasula Magomedov, *Юрий Салимханова* Yuri Limkhanova, *Шарабудина Асхабова* Sharabudina Askhaba, *Г1айнудина Гамзалаева* G1ainudina Gamzalaeva, *Имам Шамилил къватI* «Улица Шамиля»Imam Shamil Shamil Street, *Улица Салимгерева Махмуда* Salimgerev Mahmud Street, *Хасавюртовская улица* Khasavyurt Street, *Улица Саида Афанди* Said Afandi Street, *Кизлярская улица* Kizlyar Street, *Бакинская улица* Baku Street, *Улица Курамухамадхаджи Рамазанова* Kuramukhamadhaji Ramazanov Street, *Улица Дахадаева* Dahadaev Street, *Улица Фурманова* Furmanov Street, *Улица Расула Гамзатова* Rasul Gamzatov Street, *Улица Фадеева* Fadeev Street [5], etc.

Some conclusions about the anthroponymic elements in the Avar microtoponymy:

– In the education of the nominees, geographical terms and words indicating the natural features of the area are used. Subsequently, anthroponymic and abstract vocabulary are added to them, having a social and emotional-aesthetic coloring [8].

– Lexico-semantic verbalization of the wikonymic vocabulary in Avar toponymy is associated with the opposition of “friend and foe” both in territorial, spatial, and social terms [9, pp. 40-44].

– Toponyms reflect not only the feature of the object, but also the attitude of the nominating people to the area, their beliefs, customs and traditions [9, pp. 40-44; 10, pp. 23-29; 11, pp. 28-31].

– Thus, toponymic names formed from personal names in the totality of their national dialect forms, as well as from the names of land owners or first settlers of

a particular area, are widespread in Avar toponymy. Anthropotonyms account for about 50% of all names. Microtoponyms help to identify a large number of names. The ways of their penetration into toponymy can be indirect – in the studied cases through the cultivation of the land and the religious use of the anthroponym.

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尤利娅•扎多夫斯卡娅的自然哲学抒情诗中的谢林思想
THE IDEAS OF F. SCHELLING IN THE NATURAL PHILOSOPHICAL LYRICS OF JULIA ZHADOVSKAYA

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摘要。十九世纪中叶女诗人尤•V•扎多夫斯卡娅（1824–1883）抒情诗的主要意象和主题与谢林的自然哲学思想有关。抒情女主人公的世界观基于对自然意识和精神性的信念。与宇宙融合的主题是诗歌《奋斗》、《春天快到了》、《再次静静地在我上方》和抒情诗集《黄昏的魅力》抒情情节的基础。女诗人哲学抒情诗中的自然形象体现了和谐，其中季节、白天和夜晚的关系和相互过渡被视为自然事件。在尤•V•扎多夫斯卡娅的世界艺术画卷中，可以发现浪漫主义时代关于二元世界的思想，当时人与自然之间发生了精神上的决裂。女诗人创造了一幅独特的作者世界图景，其中自然的形象与女主人公对自己的感受和经历的反思、对精神价值的思考以及对人生正确道路的选择相互关联。

关键词：尤利娅•扎多夫斯卡娅、抒情诗、谢林、自然哲学、与自然融合、浪漫主义、和谐、自然、精神差距、价值观、人生道路。

Abstract. *The key images and motifs of the lyrics of the mid-19th century poetess Yu.V. Zhadovskaya (1824-1883) are related to the natural philosophical ideas of F. Schelling. The worldview of the lyrical heroine is based on the conviction of the consciousness and spirituality of nature. The motif of merging with the universe is the basis of the lyrical plot of the poems «Striving», «Soon Spring», «Again Quietly Above Me» and the lyrical cycle «The Enchantment of the Evening». The image of nature in the philosophical lyrics of the poetess illustrates harmony, where the relationship and mutual transition of the seasons, day and night are perceived as a natural event. In the artistic picture of the world of Yu.V. Zhadovskaya, the ideas of the Romantic era about the dual world are found, when a spiritual break between man and nature occurs. The poetess creates a unique authorial picture of the world, in which the image of nature is correlated with the heroine's reflection on her feelings and experiences, with thoughts about spiritual values and the choice of the right path in life.*

Keywords: *Yulia Zhadovskaya, lyrics, Schelling, natural philosophy, merging with nature, romanticism, harmony, nature, spiritual gap, values, life path.*

Introduction

This year marks the 200th anniversary of the birth of Yulia Valerianovna Zhadovskaya (1824-1883). Currently, her name is almost forgotten, but it was well known to her contemporaries. The works of Yulia V. Zhadovskaya were published in popular magazines of that time: in the «Library for Reading», «Moskvityanin», «Yaroslavl Literary Collection», «Russian Herald».

Poems of Yulia V. Zhadovskaya's «Sad Picture» and «My Field, My Field...» became textbooks and were included in Soviet and modern textbooks on Russian literature (see, for example, [1]). It is known that N.G. Chernyshevsky knew some of the poetess's poems by heart, I.A. Bunin rewrote for himself the text of «Quietly I wander alone through the garden...», and V. Bryusov kept translations of Yu.V. Zhadovskaya from Uland [2]. Famous composers - Glinka, Dargomyzhsky, Varlamov, Grechaninov, Rachmaninov - wrote romances based on the texts of Yu.V. Zhadovskaya.

Most of the lifetime publications of Yu.V. Zhadovskaya's poems were published in the scholarly and literary journal «Moskvityanin», published by M.P. Pogodin. The pages of this journal published D.V. Venevitinov, V.F. Odoevsky, I.V. Kireevsky, A.S. Khomyakov, A.A. Grigoriev and other Russian thinkers with whom Yulia Valerianovna was personally acquainted. All of them at different times were fascinated by the philosophical ideas of Friedrich Schelling and even knew him personally (It is known that the Kireevsky brothers and A.S. Khomyakov, while being students, listened to Schelling's lectures. In 1835, the historian M.N. Pogodin visited Schelling and described in detail the conversation with him in his report to the Minister of Education S.S. Uvarov. In 1842, V.F. Odoevsky and A.S. Khomyakov met with him [3]). During the fifteen years of its existence (1841–1856), the journal published many articles and notes about Schelling. Discussion and Results

Schelling's natural philosophy, which allowed for a global interpretation of man based on his original relationship with the natural world, the doctrine of «organic synthesis» and the «world soul» [4-5] also influenced the work of Yulia Yu.V. Zhadovskaya. About a third of the writer's creative legacy consists of poems dedicated to nature. In 1851, Yu.V. Zhadovskaya wrote: *«Nature! It is almost a deity for me. Its beauty revives the soul, raises from the bottom all that is cherished ...»* [6].

Thus, an important component of Yu.V. Zhadovskaya's worldview is an appeal to nature. Nature is the personification of harmony, beauty and perfection, absent in the human world and the soul of the heroine; there is no hatred and cruelty in nature, it, unlike people, is not characterized by contradictions. In this, the lyrics of Yu.V. Zhadovsky comes closer to Tyutchev's understanding of nature as the embodiment of harmony, contrasting with human existence.

Yu. V. Zhadovskaya in a letter to N. Bartenev in 1848 spoke about her perception of nature as a single whole with man: “Man is entirely in nature, and all of nature is in man. Love for it is not a fantasy, not a poetic dream, but a consequence of deep, secret sympathy and similarity... In nature, we - willingly or unwillingly - by the power of invincible egoism love ourselves, our past sorrows or joys, hopes or memories” [6].

The worldview of the lyrical heroine, based on the conviction of the consciousness and spirituality of nature, is related to the natural philosophical ideas of Schelling.

Schelling’s thesis on the existence of a “world soul”, i.e. on the spirituality and consciousness of nature, finds its expression in many poetic texts of Yu. V. Zhadovskaya, for example, in the poem “How sweet it is for me to lean...” (1858) [7, p.113]. It is written in free verse, which is common in the works of Yu.V. Zhadovskaya, which allows her thoughts to be expressed in a natural and extremely confessional way: *“How sweet it is for me to lean / To your holy bed, / All-healing Mother - / Nature!”* [7, p.113]. Nature becomes not only a source of oblivion and temporary relief, but of healing once and for all, and this is due to the fact that everything in the soul of the lyrical heroine has become enlightened, “the discordant voices // of mad passions have fallen silent”, she has found complete harmony in her soul, consonant with the harmony of nature. Nature acts as a symbol of eternal life, is perceived as something divine - hence the epithet “holy” and the spelling of the address to it with a capital letter “Your”, “Yours”, as when mentioning divine power. Yu. V. Zhadovskaya wrote about this understanding of nature in her letters: *“Study me,” nature spoke to man, “and you will know God in his creation, and if you are convinced that He exists, that everything comes from His hands wisely and beautifully... live your time calmly and wisely and in the end pass your spirit to Him, your Father and Creator”* [8, p. 243]. The assertion about the existence of the “universal will” is one of Schelling’s main thoughts on the philosophy of nature. It is precisely man’s unwillingness to follow this will that leads, according to Schelling, to many of the problems and troubles of humanity [4]. Merging with the “world soul” as a result of following the “universal will” is the only way out for man. The motive of merging with the universe is one of the most frequent in the lyrics of Yu. V. Zhadovskaya. For example, this motif becomes the basis of the lyrical plot of the poems “Striving” (*“There, high up, to the skies! / I feel cramped; my heart asks for freedom / And my thoughts carry me away into the distance, / There, to the countless stars!”* [9, p. 7]) and “Again, it’s calm above me” (“Again, it’s calm above me / The skies shine, / And my eyes sparkle with an unaccountable tear” [9, p. 39]). Nature calms, gives consolation, but in the artistic world of the poetess such actions are temporary. On the one hand, nature gives the happiness of communicating with it, on the other hand, it further enhances the

dramatic contrast between the sinful existence of man and the harmonious world of nature: *"Evening... this evening... // Breathes with wonderful bliss... // But love and grief // Embrace my soul" ("In the Evening"*, [7, p. 84]). Moments of communication with nature are perceived as short-lived and short-lived happiness, while the rest of human life is permeated with disharmony and mental suffering. N.A. Dobrolyubov, discussing the subject matter of Yu.V. Zhadovskaya's poems, notes that "the peculiarity and strength of Mrs. Yu.V. Zhadovskaya's subjective talent lies precisely in the fact that she does not unconditionally submit to external impressions of nature, but knows how to process them in accordance with her inner mood" [10, p.501]. Landscape in the artistic world of the poetess has a psychologized character. Landscape becomes not just a means of describing the beauty of nature, but mainly a means of illustrating the experiences, mood and feelings of the lyrical heroine.

Psychological parallelism, characteristic of poets of the Romantic era, is also reflected in the lyrics of Yu. V. Zhadovskaya. For example, in the poem "Spring is Coming Soon," the comparison of nature and the movements of the human soul helps to enhance the light intonations of the poem: *"Spring is coming soon! Look: under the hot beam // The snow is noticeably disappearing... // I suddenly felt good and light, so light, // As if spring were also coming in my soul..."* [7, p.86]. Similar "pantheistic compositions" are found in the lyrics of mature Pushkin, Lermontov, and especially Tyutchev [11, p.88].

Another feature of the poetess's natural-philosophical picture of the world is the illustration of the harmony of nature, where the interconnection and mutual transition of seasons, day and night are perceived as a natural event.

The poetess strives to describe not static phenomena of nature, but dynamic changes, depicting its spirituality and mobility. Nature is a living organism. For example, the day in the lyrical cycle "The Enchantment of the Evening" [7, p. 76] is presented in a living change of its stages - the proud shine of the morning sun is replaced by the unbearable heat of the day. The rising evening fog gives long-awaited coolness and silence. The day ends with a grandiose night mystery, in which natural objects participate: the evening "lit up" the stars; a "harmonious choir of luminaries" appears; two clouds, "drenched in the reflection of the dawn", rush and merge into one, and the culmination of this action is the appearance of a shooting star, in the image of which the lyrical experience of loneliness and longing for the spiritual break between man and nature is embodied [12]. Nature in the artistic picture of the world of Yu. V. Zhadovskaya is not so much a landscape as space. This feature of her lyrics is similar to the natural philosophical lyrics of Tyutchev. The subject of poetic reflection is not specific persons, for example, the lyrical heroine or her lover, but superpersonal forces and patterns. "The secret trembling of leaves", "the shining of stars", "the coolness of the evening", "the

ghostly morning fog", "the scarlet dawn of the east" - pure manifestations of nature as such, isolated from the concreteness of the landscape and elevated to the rank of eternal entities, presented not only to the eye, but also to the mind.

Conclusion

The key images and motives of the lyrics of Yu. V. Yu. V. Zhadovskaya are related to the natural philosophical ideas of F. Schelling. The worldview of the lyrical heroine is based on the conviction of the consciousness and spirituality of nature. The lyrical plot of many poems contains motives of merging with the universe and the spiritual rupture of man and nature. The image of nature in the poetess's philosophical lyrics illustrates harmony, where the interconnection and transition of seasons, day and night are perceived as a natural event. In this way, the poetess creates a unique authorial picture of the world, in which the image of nature is correlated with the heroine's reflection on her feelings and experiences, with thoughts on spiritual values and the choice of the right path in life.

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青少年价值观转变的思想支撑：青少年道德优化发展的关键
IDEOLOGICAL SUPPORT OF TRANSFORMATIONS OF YOUTH'S VALUES: THE KEY TO OPTIMIZING THE DEVELOPMENT OF THEIR MORALITY

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摘要。本文从哲学角度考察了理想的意识形态范式，该范式可以进一步作为制定官方国家意识形态的基础。从其对现代青年道德转变过程的影响的角度来考虑该模型。本科学研究的目的是从哲学角度发展理想的意识形态模型，并分析其对现代俄罗斯青年个人意识价值态度转变过程的影响。引言部分考察了目前在俄罗斯青年代表中形成的意识价值体系的想象范式以及信息社会中俄罗斯青年道德转变的主要决定因素。本文的主要部分指出，为了社会的生存，必须确保其发展的进步趋势，而精神成分的主导地位将在很大程度上促进这一趋势，无论是在年轻一代的道德中，还是在整个公众意识中。另一方面，寡头政权通过在上层建筑中使用定性定义的意识形态范式，将社会经济形态转变为消费形态。与此同时，在年轻人和社会的意识价值体系中都出现了一种精神规范趋于平衡的趋势。从辩证法的角度来看，解决这些矛盾将为我们社会的进一步发展提供动力。同时，必须确保以下条件：释放不应具有对抗性，而应具有和谐性，否则，社会冲突不可避免。最后，提出了“社会正义意识形态”的模型，并考虑了其主要功能。“社会正义意识形态”的应用必然会导致有针对性地转变年轻一代和整个社会的意识价值态度，最终导致社会发展中出现进步趋势，其本质在于社会关系的和谐。

关键词：意识形态、转变、年轻一代、道德、价值取向、道德教育。

Abstract. *This article examines the ideal ideological paradigm in its philosophical aspect, which can be further taken as a basis for developing an official state ideology. The model is considered from the point of view of its influence on the transformation processes occurring in the morality of modern youth. The purpose of this scientific study is to develop an ideal ideological model, as well as to analyze its influence on the process of transforming the value attitudes of individual consciousness of modern Russian youth, in a philosophical aspect. The introduction examines the imaginary paradigm of the value system of consciousness currently formed among representatives of Russian youth and the main determinants of the transformation of the morality of Russian youth in the information society. The main part of the article indicates that for the survival of society it is necessary to ensure progressive trends in its development, which will be largely facilitated by the dominance of the spiritual component, both in the morality of the younger generation and in public consciousness as a whole. On the other hand, the oligarchy, through the use of a qualitatively defined ideological paradigm in the superstructure, transformed the socio-economic formation into a consumer one. At the same time, a tendency to level spiritual norms has emerged, both in the value system of consciousness of young people and society. The resolution of these contradictions will provide an opportunity, from the point of view of dialectics, to provide an impetus for the further development of our society. At the same time, it is necessary to ensure the following condition: the unleashing should not be of an antagonistic, but harmonious nature, otherwise, inevitable social conflicts. In conclusion, a model of the «ideology of social justice» is proposed and its main functions are considered. The application of the «ideology of social justice» will inevitably entail targeted transformations of the value attitudes of consciousness, both of the younger generation and of society as a whole, which, ultimately, will lead to the manifestation of a progressive tendency in the development of society, the essence of which lies in the harmonization of social relations.*

Keywords: *ideology, transformations, younger generation, morality, value orientations, moral education.*

The younger generation is a special social community in which the system of value norms that is part of individual consciousness is actively transformed. The purpose of this scientific research is to develop an ideal ideological model, as well as to analyze its influence on the process of transformation of value attitudes of individual consciousness of modern Russian youth, in a philosophical aspect.

The object of the study is an imaginary paradigm of the value system of consciousness, currently formed among representatives of the youth of Russia. The subject of the study is the main determinants of the transformation of morality of Russian youth in the conditions of the information society.

The institution of the family is an effective tool for transforming the morality of youth. However, in order to preserve the value attitudes integrated by this institution into the consciousness of the young generation, it is necessary to make every possible effort so that these attitudes are not only consolidated, but can also develop in a targeted manner. In other words, it is necessary to ensure the moral education and improvement of young people throughout their future lives. The fact is that this process should be continuous and, accordingly, directed, in particular, this was pointed out in the works of K. A. Saint-Simon. The question arises: who should ensure the continuity of this process? Actually, our society should create the appropriate conditions. A number of philosophers came to a similar conclusion, only somewhat earlier, and they directly noted the close role of society in creating conditions for systematic moral education and improvement of the individual. In particular, F. Bacon pointed out that the improvement of the individual's morality occurs under the direct influence of the conditions created by society. K. Marx and F. Engels made a similar conclusion, and, based on their own category of socio-economic formation, they singled out social existence and the social relations developing in it as the main reasons determining the views and ideas of the individual. Along with the influence that the social environment has on the development of value attitudes of the younger generation, scientists have identified a very important qualitative characteristic of the process of interaction between the individual and society: only society helps a person become the highest measure of morality, because he has no opportunity to receive this quality from himself. It is in it, in the individual, that the abilities to hope, believe and love are fixed. Therefore, our society needs to begin a complex process that should lead to the solution of the following tasks: firstly, to ensure the effective use of the family institution for the transformation of the morality of the younger generation, with the aim of integrating spiritual norms into it; secondly, to consolidate the dominance of the spiritual component in the value system of both the youth and the public consciousness as a whole. Thirdly, to ensure stimulation of the process of self-improvement of individuals. The essence of the minimum strategic goal, which should ultimately be achieved, is the harmonization of social relations for the further progressive development of society itself. At the same time, this goal must be achieved through the effective use of the means and instruments available to our state. Why the state? Because the state is "the only person for whose actions a multitude of people have made themselves responsible through a mutual agreement among themselves, so that this person can use the power and means of all of them as it deems necessary for their peace and universal protection," as well as the territorial and temporary consolidation of society. Therefore, the state must make every effort to transform the morality of society in such a way that spiritual values prevail in it. However, in this case, a natural question arises: how can the state

change the vector of attitudes to value norms, if, firstly, it is the position of the Russian oligarchy, regarding value orientations, that leads to the fact that certain norms are integrated into public consciousness, or rejected [3]. Secondly, the elite deliberately led to the dominance of the material component in the morality of our society, and this trend manifested itself as a result of the use of «soft ideology». Thus, certain contradictions arise: on the one hand, for the survival of society, it is necessary to ensure progressive trends in its development, which will be largely facilitated by the dominance of the spiritual component, both in the morality of the younger generation and in public consciousness as a whole. On the other hand, the oligarchy, by using a qualitatively defined ideological paradigm in the superstructure, transformed the socio-economic formation into a consumer one. At the same time, a tendency to level spiritual norms has emerged, both in the value system of consciousness of young people and in society. The resolution of these contradictions will provide an opportunity, from the point of view of dialectics, to provide an impetus for the further development of our society. At the same time, it is necessary to ensure the following condition: the unleashing should not be antagonistic, but harmonious, otherwise, inevitable social conflicts. It would seem that the essence of the resolution is formed at the beginning of qualitative changes that will take place in the public consciousness, as well as in the morality of the younger generation. However, in fact, this is only the «tip of the iceberg.» Let us try to briefly highlight the «underwater» part. For this, let us consider our society as an abstract-logical model of a socio-economic formation. The latter, as is known, includes a base and a superstructure.

The base is a set of production relations that determine ideological approaches. It includes the right of private ownership of the means of production, as the basis of economic relations, which, in turn, are the most important aspect of production relations. The superstructure is, first of all, a set of ideas and ideological relations, as well as the institutions that fix them (political parties, legislative and executive authorities, trade unions, etc.). Despite the fact that the base, in relation to the superstructure, is decisive, it is the transforming elements of the superstructure that, as they develop, are capable of leading to its qualitative changes. And, first of all, this concerns ideology, which is fundamental in the superstructure. It is necessary to point out one of the main conclusions that will help to understand the entire complexity of the process of catalyzing metamorphoses in the base: many strategic industrial and financial resources are concentrated in a relatively small number of owners, who are oligarchs. Therefore, the question arises, how can qualitative transformations be ensured in the base in order to simultaneously begin the processes of changing the superstructure? Let us note the main ones: partial nationalization of the production complex, ensuring the economic independence of the country and its defense capability; reducing the level of corruption in the tax

system; creation of a market mechanism for re-privatization; changing the model of formation of the state budget, etc. Consideration of the effectiveness of these measures is not the task of this work, but it is indisputable that there is a need to carry them out in order to preserve our society, as well as to ensure the solution of the main task facing it: the reproduction of man as a social being.

It is natural that the transformations that will be consistently carried out in the base will entail the need for changes in the superstructure, and, above all, in ideology.

However, it is also necessary to solve an important task that, firstly, will allow the process of changing the base to begin; secondly, will accelerate the metamorphoses in the superstructure; thirdly, will ensure a harmonious nature of the resolution of contradictions, the essence of which we have outlined above.

The content of this task is as follows: it is necessary to transform the consciousness of the elite itself. It is indisputable that science itself should act as a force capable of catalyzing the process of changing consciousness. Its representatives not only should, but are obliged, by using various information resources, to prove to the ruling elite, as well as to acquaint representatives of other classes with what awaits our society as a socio-economic formation, if its basis and superstructure are not radically changed. [6] Scientists who actually strive to preserve and further develop our society, its historical cultural values; who want the state not to disappear from the world map, becoming a victim of yet another geopolitical division, must prove to the ruling elite that “history looks not at a person, but at society”, therefore the main task of the political elite is to preserve and increase our national cultural achievements so that they can be used by representatives of not only society, but the entire human civilization. [8] And its decision depends, first of all, on whether spiritual norms will prevail in the value system of both youth and society. In turn, the implementation of this task will not allow us to merge with the global consumer society, becoming part of the global matrix, but to develop harmoniously, building relationships between people based on spiritual norms. [7]

In addition, scientists need to explain to the ruling elite that, firstly, the harmonious development of a young person as an individual is impossible in a consumer society. Secondly, individuals with high moral potential will make up the majority in our society only under the condition that relationships based on spiritual values will prevail in it.

It is indisputable that it will be quite difficult to transform the consciousness of the elite, since any individual “cannot get out of his consciousness as well as out of his skin, and directly lives only in it.” However, for the further progressive development of our society, it is necessary to ensure an effective solution to this problem. [6] Now we should turn to the issue of changing the superstructure, or rather

its main component, ideology, since, in fact, it is related to the topic of this study. The essence, qualitative characteristics, and degree of influence on the morality of an individual of the ideological paradigm used in our country have been considered earlier in one of the works. Briefly, we note that the ruling elite of Russia uses a latent «soft ideology», with the help of which it successfully integrates material value orientations into both the morality of youth and society. In turn, based on the fact that ideology is an effective tool that allows for targeted transformations in the system of values of consciousness of both the young generation and society, the state should also use the official ideology, in the paradigm of which spiritual norms will dominate, in order to implement targeted changes in the morality of both youth and society.[8]

Firstly, this will allow us to more effectively ensure the preservation and development of spiritual norms integrated into the morality of the younger generation by the institution of the family, as well as to broadcast new ones. Secondly, the use of official state ideology will inevitably entail the leveling of the consequences of the impact of «soft ideology» that take place in the value system of the consciousness of the younger generation. Thirdly, using the new ideology, we should try to solve a very important issue. [9] Its essence is a war between members of society, in which representatives of the younger generation are also involved. At the same time, we are not talking about open military confrontation. If we consider war as a moment of hostility, a struggle between individuals and groups of individuals, expressed in the construction of social relations, on such norms as benefit, envy, greed, self-interest, we can make a very important conclusion: in our society there is a war between people. Undoubtedly, in this war waged in our society, there may be individual winners, but, as a whole, society will win only as a loser, which will result, at a minimum, in its joining the global consumption matrix, and, consequently, in its isolation from participation in the progressive development of human civilization. Therefore, the development and implementation of an appropriate official ideology will allow us to begin the process of harmonizing social relations, and, above all, those built by representatives of the younger generation, which, in turn, will entail the localization and cessation of hostilities between members of our society. [10]

It is natural that the relevant state institutions will need to develop a number of documents defining both the scope of the ideology and its paradigm. It should be taken into account that first it is necessary to make appropriate changes to the basic law - the Constitution. We believe that this will be correct, and most importantly - honest, in relation to the entire society, since, postulating the thesis of the absence of ideology, the ruling elite is actively using a «soft» one. A natural question arises: will our society accept this ideology? Undoubtedly, because the deeper the contradictions in society, the higher the level of its crisis, the more in demand are new ideas perceived as a new ideological model. [3]

Let's conventionally call this ideological model - «the ideology of social justice».

The following principles should form the basis of the «ideology of social justice»:

1. return to historical cultural values. Firstly, culture is a product of society, sublimating in itself all the values created by this society or borrowed, performing one of the most important functions in society - integrating. At the same time, culture is not only a set of created values, but also a way of assimilating them, through the realization of the creative potential of the individual [4]. Secondly, a person existing in any society cannot help but fall under the influence of its culture, since it is quite difficult to exist and develop in society, rejecting its cultural norms as a set of values [5]. Thirdly, the dialectical principle of determinism is manifested not only in the fact that culture is the result of the activity of society, but also in the fact that the further development of society itself is conditioned by the transformations occurring in its culture. Fourthly, it is through the achievements of culture that our society can actively influence the transformation of the morality of the younger generation. Therefore, the inclusion of historical cultural norms in the ideological paradigm will allow us to begin the process of replacing material norms and corresponding value orientations, both in the morality of the younger generation and in society as a whole. We should not forget that the prospects for the development of our society depend on the values that the younger generation consciously chooses and integrates into its consciousness. Therefore, the use of historical cultural norms in the ideological paradigm will make it possible to educate people who will be able to combine society, build harmonious relationships within it, which in turn will allow it to develop progressively.

2. The principle of «love for one's neighbor». Undoubtedly, its use will serve as a reason for catalyzing the process of «revision» of values, the consequence of which will be the inclusion of spiritual norms in the morality of both the younger generation and society as a whole. In turn, this will cause the manifestation of a progressive trend in the development of society.

3. Freedom of the individual within the law. We are confident that freedom is one of the main values that must be included in the ideological paradigm. At the same time, firstly, freedom is considered as a conscious necessity, which is the basis of a humane society. Secondly, the freedom of the individual is determined by the totality of opportunities provided directly by society. Therefore, it is the degree of personal freedom that determines the progressive trend in the development of society itself. Thus, the progressive trend in the development of society is a direct consequence of the increase in the degree of personal freedom.

Thirdly, the freedom of the individual is interpreted by this ideological paradigm as a direct choice by the individual of the means and methods for self-devel-

opment, as well as building relationships in society. It is assumed that this choice will be based on the value system of the individual's consciousness, as well as on the totality of opportunities provided by society.

Fourthly, freedom is not permissiveness. It implies respect for oneself and other people, spiritual development of the individual, and most importantly - responsibility to society and oneself for all actions taken.

4. from each according to his abilities, to each according to his work. [7]

Let's consider the first part of this principle. It is assumed that the family and the state provide every possible support to the individual in developing her abilities. In turn, this leads to the fact that the younger generation, when choosing a profession, proceeds from their own abilities that have reached a certain level of development. We believe that by mastering the skills of a profession that corresponds to the individual's abilities, the latter will consciously master them, which, in turn, will lead to a high level of professionalism.

Let's move on to presenting an understanding of the second part of the principle. It is assumed that there is a need to take into account the maximum contribution of each person to the development of the industry, enterprise, etc., in which he is employed. At the same time, people engaged in intellectual work should receive payment adequate to the efforts made, in this case there will be no dissonance between the wages of a worker and an employee, which took place, for example, in the Soviet Union. We believe that it is possible to use the basic principles for calculating the payment for intellectual work, set out in the work of V. Glazunov [3]. In addition, workers in the fields of culture, education, health care, and special services should receive high wages, since they are the ones who shape a person's personality or help him preserve the main values - health and life.

5. Family as the foundation of society. Maximum support from the state for families, and, above all, material. This can be expressed in interest-free loans for the construction or purchase of housing, economically sound financial assistance to large families, etc.

6. The principle of equality in education. High-quality education at all levels should be available to representatives of any class. At the same time, it should also correspond to the abilities of the individual. As a result, this will lead to the fact that our society will have highly qualified specialists in all areas. 7. the desire for self-improvement and knowledge of the world. The use of this principle in the ideological paradigm should lead to the fact that to a certain extent the significance of material norms is devalued, while such value orientations as the desire for knowledge, expansion of consciousness, and self-improvement become a priority. 8. reasonable proportionality between private, state and collective ownership of the means of production. In this case, it is necessary to proceed from the following criteria: the country's defense capability, the maximum ability of the state, and

therefore society, to reproduce man, because, ultimately, this is the primary task of society. We will not outline the mechanism for the redistribution of ownership of the means of production, since this is not the purpose of the study, we note that the main possible principles are given in the work of V. Glazunov [3].

Conclusions. The main functions of the proposed "ideology of social justice" are as follows:

1. spiritual revival of society.

2. consolidation of society.

3. catalyzing the process of laying spiritual norms in the morality of the individual by the institution of the family.

4. consolidation of the principle of "love of one's neighbor" in social relations.

5. integration into the consciousness of representatives of the younger generation of the following theses:

a) cruelty has never been inherent in human nature [1];

b) nothing can be good for us without being good for everyone;

c) the actions of an individual should serve as an example for all of humanity;

d) labor, work, education and wisdom form the crown of glory.

6. stimulation of the process of self-improvement of the individual.

7. education in individuals of the ability to responsibly use the right of choice, when satisfying their material needs.

The application of the "ideology of social justice" will inevitably entail targeted transformations of the value systems of consciousness of both the younger generation and society as a whole, which will ultimately lead to the manifestation of a progressive tendency in the development of society, the essence of which lies in the harmonization of social relations.

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十七世纪东正教信仰在科拉半岛的传播：德温斯基区的历史回顾
THE SPREAD OF THE ORTHODOX FAITH ON THE KOLA PENINSULA IN THE XVII CENTURY: A HISTORICAL RETROSPECTIVE OF THE DVINSKY DISTRICT

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摘要。本文的主要任务是根据俄罗斯国家历史档案馆、阿尔汉格尔斯克州国家档案馆、期刊（阿尔汉格尔斯克教区新闻）的现有资料，在研究 17 世纪东正教在科拉半岛传播的历史时，引起人们对地理和宗教因素的关注。本文介绍了哪些修道院在 17 世纪拥有科拉半岛德温斯基区的土地，并研究了翁巴和瓦尔祖加村教区教堂的产生及其对北极圈以外东正教传播的影响。

关键词：科拉北部、东正教、德温斯基区、阿尔汉格尔斯克、白海、瓦尔祖加、翁巴、圣尼古拉斯奇迹工作者、教区、圣母升天教堂、东正教修道院、霍尔莫戈里和瓦热教区。

Abstract. *The main task of this article is to draw attention to geographical and religious factors in the study of the history of the spread of the Orthodox faith on the Kola Peninsula in the XVII century on the basis of available sources from the Russian State Historical Archive, the State Archive of the Arkhangelsk Region, periodicals (Arkhangelsk Diocesan News). This article describes which monasteries owned the lands of Dvinsky district in the XVII century on the Kola Peninsula, and also examines the generation of parish churches in the villages of Umba and Varzuga and their influence on the spread of Orthodoxy beyond the Arctic Circle.*

Keywords: *Kola North, Orthodox faith, Dvinsky district, Arkhangelsk, White Sea, Varzuga, Umba,Saint Nicholas the Wonderworker, parish, Assumption Church, Orthodox monasteries, Kholmogory and Vazhe diocese.*

In Russia in the 17th century, there was an intertwining and interpenetration of the Church and the state into each other's competence. In such conditions, any church action had the significance of a state action, and any change in the state was within the sphere of interests of the Church and required its approval (perhaps purely formal) [1]. It is important to emphasize that the Russian North in the 17th century was not a remote, isolated outskirts. Intensive international trade developed on the White Sea and in Murman. The industrial life of the northern region revived after the establishment of trade relations with the West through the White Sea in the second half of the 16th century. The opportunity that opened up for the profitable sale of products of the marine and forest industries attracted new settlers to the Russian North, who increased the number of the local population. Merchants from Moscow, Yaroslavl, Novgorod, Vologda, Vyatka, Solikamsk and other Russian cities met here with merchants from England, Holland, Denmark, Norway, France.

In turn, the Moscow government, in the interests of protecting the population, as well as to assert its authority, decided to build several fortified points. Thus, during the reign of Fyodor Ivanovich, the city of Arkhangelsk was established at the mouth of the Northern Dvina. This city was intended to become a port and administrative center of the White Sea coast. Sumsky Fortress on the Karelian coast and Kola Fortress in Northern Lapland were also built. In turn, due to the increase in the population in the northern region, the Moscow government decided to divide the Russian North into several districts in order to facilitate governance. At the beginning of the 17th century, the following districts were separated from one Dvina land: Dvinsky, Vazhsky, Mezensky, Kevrolsky, Pustozersky and Kola [2].

A brief historical background: in the 17th century, the Dvinsky district included the lands of the lower reaches of the Northern Dvina and its tributaries, the Yemtsa and Pinega, as well as the coast of the Dvina Bay (the Summer and Winter shores) of the White Sea. In the south, the border with the Vazhsky district passed through the Dvina above the mouth of the Vaga River, including almost the entire course of the Mekhrenga River. In the east, the Dvinsky district bordered on the Kevrolsky and Mezensky districts, and in the west on the Kargopolsky district (the border with the latter ran through the Onega Peninsula - Banev Navolok near Lopshenga) [3].

This scientific article will present which monasteries belonged to the Dvinsky district in the 17th century on the Kola Peninsula, and will also examine the formation of Orthodox parish churches belonging to the Dvinsky district, since by the beginning of the 17th century, the Umba and Varzuga volosts, located "beyond the sea", in the southern part of the Kola Peninsula, were included in its composition (while in the 16th century they were described as part of the Kola district) [4].

One of the important sources for studying the Dvinsky district are the census books of M. A. Velyaminov and the clerks B. Stepanov and A. Podolsky (1622-

1624) - these are the originals signed by Bazhen Stepanov and Anton Podolsky. Currently, these census books are in the Russian State Archive of Ancient Acts (F. 1209. D. 9-11) [5]. However, 7 notebooks of the census book perished in a fire in 1626 in Moscow, as a result of which in May 1627, clerk Bazhen Stepanov was again sent to the Dvinsky district to describe the volosts mentioned in the notebooks destroyed by the fire [6]. It should be noted that the compilers of the census book collected information about monasteries and parish churches and their possessions and placed it at the end of the document.

It is important to note that the census books of the Dvina districts and settlements were compiled by I. I. Filosofov and the clerk K. Patrikeev. The census books were prepared on December 29, 1646. The originals of these documents have been preserved. However, the census books contain only information about the households and their population [7].

In turn, it should be noted that in the Dvinsky district, according to the census book of 1622-1624, 18 monasteries had lands (including the Kola Trinity Pechenga Monastery), as well as the patriarchal see and the Kholmogory cathedral church. Among the Nedvinsky monasteries-landowners, it is necessary to note the Kola Trinity Pechenga Monastery, which acquired the village of Nevzorovskaya in the Kureiskaya volost near Kholmogory (according to deeds and data from 1570-1604) [8]. It is no coincidence that the main object of colonization of the largest church feudal lords in the late 16th - early 17th centuries were the lands on the Tersky coast of the Kola Peninsula - the Umba and Varzuga volosts. In 1585, the Umba volost with its rich sea and fishing industries was completely divided between the Solovetsky and Kirillo-Belozersky monasteries - ¼ of the volost was allocated to the Solovetsky Monastery, and ¾ - to the Kirillovsky elders. It is interesting to note the fact that through the efforts of the Solovetsky Monastery, a church in the name of the Resurrection of Christ with an aisle in honor of St. Kirill of Belozersk was built in the village of Umba [9]. Subsequently, the possessions of the Kola Trinity Pechenga Monastery located in the Umba volost were seized by the Belozersk brethren [10].

The village of Varzuga, also belonging to the Dvinsky district in the 17th century, was located on the Tersky coast of the White Sea and was the very first Russian settlement on the Kola Peninsula. The Nikolskaya side of the Varzuga River is the place “from which the Russian land came” in the far north of Europe. The village of Varzuga is the “cradle” of today’s Murmansk region. This village was a religious, commercial and administrative center of the southeast of the Kola Peninsula and in the 17th century belonged to the Dvinsky district. Bishops, clergy and church servants, as well as patriarchal and monastery clergymen lived in Varzuga, and the customs office was also located there.

In Varzuga Volost, the first monastic acquisitions were made by the Solovetsky Monastery already in the late 15th – early 16th centuries [11]. The Niko-

lo-Karelsky and Antonievo-Siysky Monasteries had their own possessions and industries in Varzuga, and later the Patriarchal Estate was formed [12]. Since the monastic acquisitions in Varzuga were initially made by the Solovetsky Monastery, it can be assumed that the first parish church, founded in the late 15th century, was the church consecrated in honor of the Venerable Zosima and Savvaty, the Solovetsky miracle workers. This church was visited by prayer warriors from the nearby villages of Kashkaran, Kuzomen, Tetrino, Chapom, and Umba. According to other sources, the first church, built and consecrated in 1491, was the church in the name of St. Nicholas the Wonderworker of Myra in Lycia, and the Nikolskaya (left) side of the village of Varzuga was named after the church [13]. The church in the name of the Venerable Zosima and Savvaty of Solovki fell into disrepair and was rebuilt in 1683 with the blessing of His Eminence Afanasy (Lyubimov), Archbishop of Kholmogory and Vazhe [14].

On April 10, 1597, the church was consecrated in the name of Saint Athanasius of Alexandria. Subsequently, it fell into disrepair and was rebuilt with the blessing of His Grace Makarii (Mirolyubov), Bishop of Arkhangelsk and Kholmogory on February 17, 1878. According to other sources, at the end of the 19th century, these were no longer two churches - in the name of Zosima and Savvaty and Saint Athanasius of Alexandria, but one temple, but a two-altar, wooden, square-shaped, single-domed, roofed on 4 slopes. It was located on the site of those churches that had fallen into disrepair and dilapidated. The consecration of the throne in honor of the Solovetsky miracle workers took place on August 16, 1882, and the consecration of the side chapel in the name of Saint Athanasius - on January 17, 1883 [15].

It should be noted that the Pomor craftsmen created amazing monuments of wooden architecture. The Assumption Church, which was skillfully built in 1674, has survived to this day in Varzuga. In 2024, this temple turned 350 years old. Researcher of the Kola North I. F. Ushakov determines that the builder of the unique church was called Clement [16]. The Varzuga Assumption Church is a pearl of wooden temple architecture of the Kola North and belongs to the type of tent churches. Its height is 34 meters and it is considered one of the most beautiful single-domed churches of the Russian North. It is known that the Assumption Church was built without the use of nails and staples, only with an axe, chisel, scraper and knife. The builders of the church also took care to ensure that the building did not rot or mold: for better preservation of the walls, birch bark was placed between the pine logs. The gutters and sloping roof surfaces ensure that the building dries quickly after rain. The beauty of this church was achieved thanks to the skillfully defined proportions of all its parts, the upward thrust, the presence of two tiered barrels [17] and eight kokoshniks - small cupolas that make up the appearance of a necklace at the base of the tent, as well as decorative trim: carved decorations of

the porches, lace framing of the barrels, the upper and lower parts of the tent, the plate roof of the barrels and the onion-shaped cupola. Every architectural detail shows the extraordinary skill of the ancient carpenters [18]. Since ancient times, this church was a cemetery church, erected on an ancient churchyard. The Assumption Church is located on the right bank of the Varzuga River, and on the left bank the Peter and Paul Church was built in 1694-1697. However, on July 5, 1757, a new church (or churches) was consecrated in honor of St. Nicholas the Wonderworker and the Holy Apostles Peter and Paul, which was subsequently destroyed by fire on March 30, 1853 [19].

In conclusion, we note that Orthodox churches and monasteries, performing missionary tasks on the Kola Peninsula in the 17th century, were legally part of and subordinate to the ruling bishops of the Kholmogory and Vazhe Diocese. Northern Orthodox churches were built of wood, tent or cage, warm or cold, and always occupied a special place in the architectural ensemble of the entire volost and the surrounding natural landscape [20]. Under the influence of the natural and climatic specifics of the north on the Kola Peninsula, as a result of careful selection, regional planning techniques for church construction were developed, which were reflected in the construction of churches and monasteries that were part of the overall architectural composition of the fortification structures of the Far North.

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特有植物红花树提取物的植物化学分析
PHYTOCHEMICAL ANALYSIS OF THE EXTRACT OF THE ENDEMIC PLANT OF THE OPHRYS TRANSCHYRANA

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摘要。植物化学分析是指研究植物化学成分的一系列方法。它确定植物原料中所含的生物活性物质及其数量和质量特征。

关键词：植物化学，特有，生物碱，黄酮类化合物，皂苷，粉碎机。

Abstract. *Phytochemical analysis refers to a series of methods aimed at studying the chemical composition of plants. It determines the biologically active substances contained in plant raw materials, along with their quantity and qualitative characteristics.*

Keywords: *phytochemical, endemic, alkaloid, flavonoid, saponin, pulverizer.*

Introduction

In recent years, the medicinal and resource plants of the Kopetdag region, as sources of biologically active compounds and objects of economic use, have been intensively studied. Despite the relatively small areas occupied by Turkmenistan's mountain ecosystems, the plant communities in this region are distinguished by their richness in medicinal, edible, fodder, and other useful plants. These plants are closely intertwined with their habitats and human economic activities.

A significant task for modern pharmacy and biochemistry is to expand the range of medicinal plant raw materials, which are sourced from widely distributed medicinal plants of the local flora. Despite notable successes in the synthesis and application of chemical drugs, plants remain a promising source of pharmaceutical compounds [1; 3; 4].

Research methods

During expeditions in 2023–2024, materials were collected from the Yoldere and Zyakli gorges of the southwestern Kopetdag.

Ophrys transhyrcana, a perennial herbaceous plant of the orchid family (*Orchidaceae* Juss.), grows 20–40 cm tall. It is found at altitudes of 1200–1600 m above sea level, in grassy slopes, valleys covered with trees and shrubs, shady gorges, and moist areas. The plant blooms and bears fruit in March–April.

This species is endemic to Turkmenistan, found in regions such as Yoldere, Pordere, Zyakli (Southwestern Kopetdag), and Sarymsakli (Central Kopetdag) [2; 5].

Medicinal Uses

The whole plant of Ophrys transhyrcana is used to treat various conditions, including rheumatic diseases, tuberculosis, epilepsy, dysentery, menstrual disorders, gout, asthma, skin ailments, and external inflammations. It also acts as an emollient and is used for throat inflammation. The plant's leaf juice and aerial roots are employed for ear pain and cleaning. Its roots are used to treat malarial fever, and its leaves are applied for rheumatic pain. The root juice is applied to cuts and wounds, while dried flowers are used as insect repellents and emetics.

The plant kingdom serves as a vast reservoir of biologically active compounds with diverse chemical structures and phytochemical properties, which help prevent diseases. Natural products with antimicrobial, antibacterial, and antifungal properties have garnered increasing interest in recent decades.

Preparation of extracts

Whole Ophrys transhyrcana plants were washed under running water, and excess moisture was absorbed using filter paper. The plants were then cut into small pieces, dried in an incubator at 28°C, and ground into coarse powder using a pulverizer. Sequential extractions were performed using organic solvents such as methanol, ethanol, chloroform, and hexane, utilizing ultrasonic-assisted extraction. Ultrasound frequencies ranging from 20 kHz to 2000 kHz were applied, which increased cell wall permeability and created cavitation.

Extracts were collected and evaporated in a water bath under atmospheric pressure. Residual solvents were removed under vacuum, and the extracts were stored at 4°C for phytochemical analysis.

Phytochemical Tests for Various Components

1. Alkaloids

To 1 ml of the ethanolic extract, 2–3 drops of Mayer's reagent were added. Mayer's reagent is prepared by dissolving 1.36 g of mercury chloride in 60 ml of distilled water and adding this solution to a solution of 5 g of potassium iodide in 100 ml of distilled water. The formation of a creamy or pale-yellow precipitate indicates the presence of alkaloids.

2. Terpenoids (Salkowski Test)

To 1 ml of the extract, 2 ml of chloroform was added and mixed well. Concentrated H_2SO_4 (3 ml) was carefully added along the walls of the test tube to form a separate layer. A red-brown color at the interface of the two layers confirms the presence of terpenoids. Handle H_2SO_4 with care to avoid mixing of layers.

3. Flavonoids

To 1 ml of the extract, a few drops of diluted 1 N NaOH were added, resulting in a yellow-colored solution. Subsequently, a few drops of diluted HCl were added. The disappearance of the yellow color indicates the presence of flavonoids.

4. Tannins

To 1 ml of the extract, a few drops of 1% lead acetate solution were added. The formation of a yellowish precipitate confirms the presence of tannins.

5. Phlobatannins

To 1 ml of the extract dissolved in distilled water, the solution was filtered, and the filtrate was boiled with 2% HCl. The formation of a red precipitate indicates the presence of phlobatannins. Observe immediately after boiling.

6. Coumarins

To 2 ml of the aqueous extract, 3 ml of 10% NaOH was added and mixed well. The development of a yellow color confirms the presence of coumarins. Allow a few minutes for color development if necessary.

7. Steroids

To 1 ml of the extract, 10 ml of chloroform was added and mixed thoroughly. An equal volume of concentrated H_2SO_4 was carefully added along the sides of the test tube. The appearance of a red upper layer and a yellow-green fluorescence in the H_2SO_4 layer indicates the presence of steroids. Avoid mixing the layers during the addition of H_2SO_4.

8. Phenols

To 2 ml of the extract, 2 ml of 5% ferric chloride solution was added. The formation of a blue-green solution confirms the presence of phenols.

9. Saponins

To 5 ml of the extract, 10 ml of distilled water was added in a test tube and boiled. After cooling, the solution was shaken vigorously for 30 seconds and allowed to stand for 30 minutes. The formation of a persistent foam layer confirms the presence of saponins.

10. Amino Acids

To 1 ml of the extract, a few drops of ninhydrin reagent were added. The solution was heated gently, and the appearance of a purple color indicates the presence of amino acids.

11. Glycosides

To 1 ml of the extract, 1 ml of alpha-naphthol (5% in chloroform) was added along the sides of the test tube. Concentrated H_2SO_4 was then carefully added to

form a layer. The development of a violet color at the interface indicates the presence of glycosides.

12. Carbohydrates

To the alcoholic solution of the extract (70% ethanol), 10% aqueous alpha-naphthol solution was added and mixed. Concentrated H_2SO_4 was then carefully added along the side of the test tube. The formation of a violet ring at the interface confirms the presence of carbohydrates.

Table 1

Preliminary Phytochemical Analysis of Various Extracts Ophrys Transchyrana

Phytochemical	Testing Method	Hexane	Ethanol	Chloroform	Methanol
Alkaloids	Mayer's Test	+	+	+	+
Terpenoids	Salkowski Test	+	+	+	+
Flavonoids	Alkaline Reagent Test	+	+	+	+
Tannins	Lead Acetate Test	+	+	+	+
Phlobatannins	General Test	-	-	-	-
Coumarins	General Test	-	-	-	+
Steroids	Liebermann-Burchard Test	+	+	+	+
Phenols	Iron Chloride Test	-	-	-	-
Saponins	Foam Test	-	-	-	-
Amino Acids	Ninhydrin Test	-	+	-	+
Glycosides	General Test	-	-	-	-
Carbohydrates	Molisch Test	+	+	+	+

Results and Discussion

Phytochemical screening revealed the presence of alkaloids, terpenoids, flavonoids, tannins, coumarins, steroids, amino acids, and carbohydrates across various solvent extracts (methanol, ethanol, chloroform, and hexane). Coumarins were detected exclusively in methanol extracts, while amino acids were absent in hexane and chloroform extracts. Conversely, phlobatannins, phenols, saponins, and glycosides were absent in all extracts.

The therapeutic potential of flavonoids includes antihypertensive, antimicrobial, antioxidant, and diuretic activities. Alkaloids, known as metabolic byproducts, exhibit antibacterial properties. Steroids have anti-inflammatory, lipolytic, and cholesterol-lowering effects. Tannins demonstrate various physiological actions, such as antimicrobial and antiparasitic properties, and are used in treating nonspecific diarrhea, oral and throat inflammation, and minor skin injuries.

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含硫水溶性抗氧化剂3-(3'-叔丁基-4'-羟基苯基)丙硫基磺酸钠的电化学分析
ELECTROCHEMICAL ANALYSIS OF SULFUR-CONTAINING WATER-SOLUBLE ANTIOXIDANT SODIUM 3-(3'-TERT-BUTYL-4'-HYDROXYPHENYL) PROPYLTHIOSULPHONATE

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Introduction: Antioxidants assist cells in resisting oxidative stress by effectively neutralising free radicals, and are thus associated with the prevention of diseases like cell necrosis, cardiovascular disease, cancer, neurological disorders, Parkinson's disease, Alzheimer's disease, inflammatory diseases, muscular dystrophy, liver disease, and even aging. One of the most promising areas of research in the field of antioxidant chemistry is the synthesis and study of the specific activity of organic compounds based on sulfur. The most active research in this area is being conducted at the Department of Chemistry of the FSBI HE Novosibirsk State Pedagogical University in collaboration with the Research Institute of Antioxidant Chemistry. In recent years, the Research Institute of Antioxidant Chemistry has made notable advancements, leading to the synthesis of a water-soluble pharmaceutical substance containing sulfur. In modern pharmaceutical analysis, electrochemical methods are employed to ascertain the quantity and quality of medicinal drugs. These methods are employed due to their high sensitivity, accuracy and specificity.

The **objective** is to develop a method for determining the presence of sodium 3-(3'-tert-butyl-4'-hydroxyphenyl) propylthiosulphonate in solution through the use of voltammetry.

The following section outlines the **materials and methods** employed in the study. In this research, the substance was used as provided by the Research Institute of Antioxidant Chemistry, sodium 3-(3'-tert-butyl-4'-hydroxyphenyl) pro-

pylthiosulphonate. The research analysis was conducted using the voltammetry method on a semi-automatic analyser TA-4 (Tomanalyt) with the VALabTx software. All chemicals utilised in this research were of analytical grade.

The following section presents the **findings and subsequent analysis**. Voltammetry is an electrochemical technique that is widely employed in the field of analytical chemistry. It is used to measure the current produced by an analyte as a function of the applied potential at a working electrode. This method entails varying the potential and monitoring the resulting current, thereby providing insights into the redox behaviour of electroactive species in solution. An electrical cell comprising the electrolyte solution (a mixture of KCl and NaOH), a reference electrode (an Ag/AgCl electrode) and a working electrode (a glassy carbon electrode) was utilised. The sample solution was prepared at a concentration of 1 mg/L, with a sample volume of 10 μL. The optimal conditions for the analysis of sodium 3-(3'-tert-butyl-4'-hydroxyphenyl) propylthiosulphonate were determined, namely the sweep rate, peak potential and the range of the sweep. The aforementioned conditions were employed to analyse a series of sample volumes, spanning from 10 μL to 160 μL. This was undertaken to validate the method utilising a linear approach. The coefficient of correlation between the volume and the height of the peak was determined to be $r = 0.9975$, with the equation $y = 0.0081x + 1.0258$. Furthermore, the accuracy of the method was ascertained, and the RSD was found to be less than 2% with a standard deviation of 0.001915.

In **conclusion**, In light of the aforementioned results, we have devised an electrochemical methodology for the determination of the sulfur-containing antioxidant sodium 3-(3'-tert-butyl-4'-hydroxyphenyl) propylthiosulfonate in solutions under optimized conditions. This methodology is a promising avenue for future analysis of biological samples.

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人工通气对3岁以下儿童急性脑供血不足患者心搏输出量昼夜节律的影响
THE EFFECT OF ARTIFICIAL VENTILATION ON THE CIRCADIAN RHYTHM OF STROKE VOLUME IN ACUTE CEREBRAL INSUFFICIENCY IN CHILDREN UNDER 3 YEARS OF AGE

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摘要。第 1 组（有自主呼吸）比第 2 组（人工通气）有显著增加每搏输出量昼夜节律的趋势，增加幅度为 24%。人工通气对峰值期、深水期的每搏输出量指数、每日心输出量波动幅度和范围没有显著影响。两组均出现每搏输出量昼夜节律的倒置。进行的硬件呼吸支持对急性脑功能不全患者每搏输出量昼夜节律倒置的持续时间没有显著影响。评估所研究指标平均昼夜节律相关性的方法是评估昼夜节律中血流动力学自适应重组的更有用的方法。还发现了机械呼吸支持对 3 岁以下儿童急性脑功能不全的心脏功能有良好影响的其他迹象。

关键词：人工通气、昼夜节律、每搏输出量、急性脑供血不足、儿童。

Abstract. *A significant tendency to increase the meso of the circadian rhythm of stroke volume in children with acute cerebral insufficiency was revealed in group 1 (with spontaneous breathing) than in group 2 (artificial ventilation) by 24%. Artificial ventilation did not have a significant effect on the stroke volume indices in the acrophase, bathyphase, on the amplitude and range of cardiac output fluctuations per day. Inversion of the circadian rhythm of stroke volume was revealed in both groups. The conducted hardware respiratory support did not significantly affect the duration of the inversion of the circadian rhythm of stroke volume in acute cerebral insufficiency. The method of assessing the correlations of the average circadian rhythms of the studied indices is a more informative method for assessing the adaptive restructuring of hemodynamics in the circadian rhythm. Additional signs of a favorable effect of mechanical respiratory support on cardiac function in acute cerebral insufficiency in children under 3 years of age were revealed.*

Keywords: *artificial ventilation, circadian rhythm, stroke volume, acute cerebral insufficiency, children.*

Relevance. The peculiarities of the course of pneumonia in children with juvenile cerebral insufficiency are caused by: decreased vital capacity of the lungs due to muscle weakness or spastic scoliosis; weakening of the cough reflex; frequent dysphagia and vomiting with the development of aspiration; gastroesophageal reflux disease; severe protein-energy malnutrition with manifestations of cachexia; frequent antibiotic resistance of pathogens; rapid development of metabolic acidosis and hypercapnia; development of seizures - both true and febrile. Anatomical and physiological characteristics of young children are often factors that increase vulnerability, rapid depletion of energy and other resources, lower adaptive reserve capabilities in the development of critical conditions. Due to the age-related immaturity of the circulatory system in conditions of severe infectious diseases, it is for early age that a more frequent rapid development of acute heart failure is characteristic, caused primarily by the development of an energy-deficient state of the myocardium. Due to the lack of information on the specifics of managing children with early-onset cerebral insufficiency, an attempt was made to assess the impact of mechanical respiratory support on the circadian rhythm of stroke volume (SV) in the systemic inflammatory response to complicated infectious diseases based on a study of hourly prolonged monitoring of hemodynamic parameters [1-5].

Objective of the study. To study and evaluate the effect of mechanical respiratory support on the circadian rhythm of stroke volume in acute cerebral insufficiency caused by complicated infectious diseases of young children.

Material and methods of the study. The results of continuous prolonged monitoring with hourly recording of hemodynamic and respiratory parameters were studied in children admitted to the ICU of the RRCEM in a critical condition caused by an infection complicated by acute cerebral and respiratory failure at the age of 5.5 months to 2.5 years. Intensive care was carried out according to the recommendations in the relevant clinical protocols. Group 1 included 8 children with impaired consciousness aged 12.6±5.5 months, who had no indications for mechanical respiratory support upon admission to the clinic and throughout intensive care. Almost all patients of group 2 (11 children) aged 17.4±6.1 months were transferred to mechanical ventilation according to indications from the moment of admission to the clinic. Impairment of cerebral function was assessed according to the Glasgow scale in group 1 9.1±0.4, in the second 6.5±1.0 points, which corresponded to a reliably significant suppression of brain function by 29%, which determined the duration of MRS, the duration of intensive care in the ICU and in the hospital as a whole. As the condition improved, the impaired organ functions were effectively corrected, reflexes and consciousness were restored, the patients were transferred to a specialized department.

The research data were processed by the method of variation statistics using the Excel program by calculating the arithmetic mean values (M) and errors of the

mean (m). To assess the reliability of differences in two values, the parametric Student's criterion (t) was used. The relationship between the dynamics of the studied parameters was determined by the method of paired correlations. The critical level of significance was taken to be 0.05.

Results and their discussion. A significant tendency to increase the meso of the circadian rhythm of the stroke volume in children with SV was revealed in Group 1 than in Group 2 by 24% ($p<0.05$) (Table 1). SV did not have a significant effect on the stroke volume indicators in the acrophase, bathyphase, on the amplitude, the range of oscillations of cardiac output per day.

Table 1

Average values of the parameters of the phase structure of the circadian rhythm of stroke volume, ml.

Groups	Mesor	In acrophase	In the bathyphase	Amplitude	Daily fluctuation range
1	31±2	37±2	24±3	6±2	13±3
2	25±3	33±4	19±5	8±4	15±6

Table 2.

Mesor cir rhythm SV, ml.

Days	1 groups	2 groups
1	32,7±4,0	28,9±2,5
2	32,1±1,3	29,7±1,7
3	29,7±1,7	28,6±1,3
4	31,6±2,0	28,6±1,7
5	32,3±2,6	28,7±1,4
6	33,1±2,8	26,4±1,4
7	30,5±2,6	28,8±1,0
8	32,1±2,0	29,0±1,6
9	29,3±2,0	28,5±1,6
10	31,8±3,6	30,6±1,9
11	31,8±2,5	27,7±1,3
12	35,0±2,8	30,9±1,7
13	31,4±2,3	30,4±1,5
14	28,5±2,5	28,7±1,5
15	29,4±2,2	30,2±1,9
16	32,8±2,0	28,0±1,7
17	26,4±3,4	28,4±2,5
18	32,8±3,2	29,3±1,7
19	27,1±4,0	28,4±1,6
20	31,5±2,7	27,7±1,9

Table 3.
Average circadian rhythm of SV, ml.

Hours	1 groups	2 groups
8	29±4	23±5
9	30±4	24±5
10	32±4	24±5
11	31±3	24±5
12	31±3	25±5
13	31±3	25±5
14	32±3	26±5
15	32±2	25±4
16	32±3	25±4
17	31±3	25±4
18	32±3	25±4
19	31±3	25±4
20	31±3	25±5
21	31±2	25±4
22	32±3	26±5
23	32±3	27±5
24	31±4	27±5
1	32±3	26±4
2	31±3	26±5
3	31±2	27±4
4	31±3	26±4
5	30±2	26±5
6	31±3	25±4
7	31±3	25±4

During the first 20 days of observation, no significant dynamics of intergroup differences (Table 2) or the average circadian rhythm (Table 3) of the mesoscopic circadian rhythm indicator SV were detected.

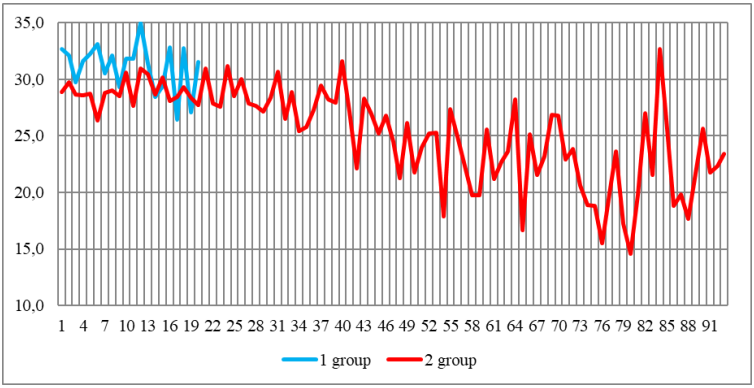

Figure 1. *Mesor of circadian rhythm of SV, ml*

Prolonged MRS in a 2-year-old child up to 93 days, with subsequent restoration of consciousness, adequate breathing was accompanied by fluctuations in the mesor of circadian rhythm of stroke volume, a decrease in stroke volume to 15 ml on the 80th day and an increase in the indicator to 33 ml on the 85th day (Fig. 1). In the average circadian rhythm, the projection of the acrophase of the circadian rhythm of stroke volume was noted in children of group 1 at 23:00 (clockwise shift by 12 hours) (Fig. 2). And in group 2, the projection of the peak of the acrophase was noted at 24:00 (shift by 13 hours). That is, in both groups, an inversion of the circadian rhythm of stroke volume was revealed.

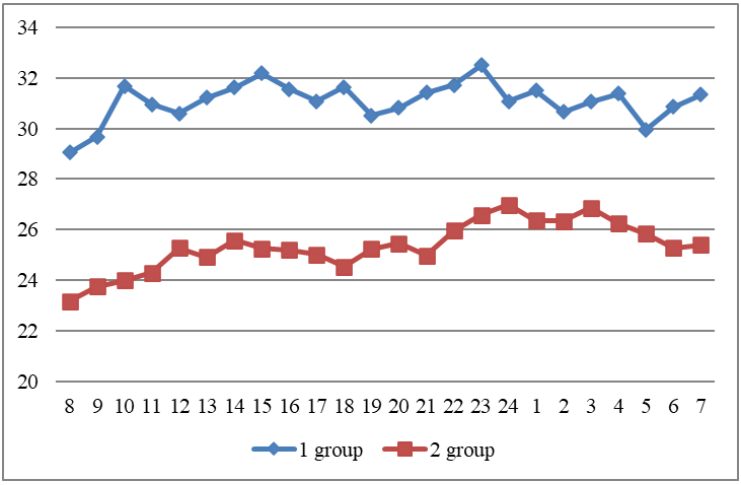

Figure 2. *Average circadian rhythm of SV, ml.*

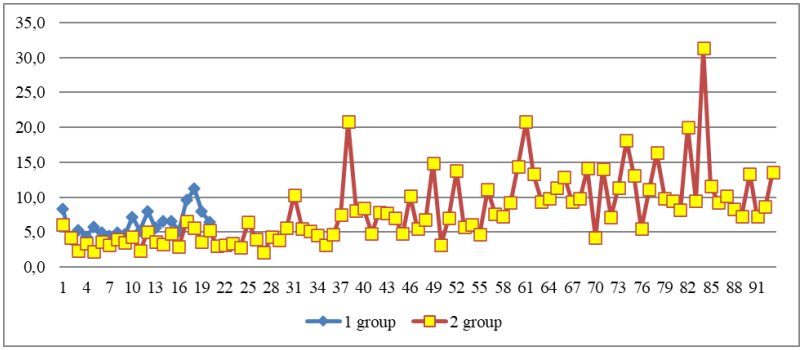

Figure 3. *Amplitude of the circadian rhythm of SV, ml*

A more noticeable tendency to increase the amplitude of the circadian rhythm of SV in children of group 1 in the first 20 days of treatment was due to the restriction of stress-limiting therapy with sedatives due to the risk of central depression of external respiration (Fig. 3). The increase in the amplitude of the circadian rhythm in children of group 2 on the 37th, 61st, 85th day was due to the current mobilization of compensatory increase in cardiac output in the process of adaptation of external and tissue respiration in the process of more difficult restoration of the function of the respiratory system under conditions of layering of repeatedly aggravated or emerging new factors (energy deficit not replenished in a timely manner, secondary immunodeficiency state, not entirely adequate selection of the ventilation mode, other shifts in homeostasis systems).

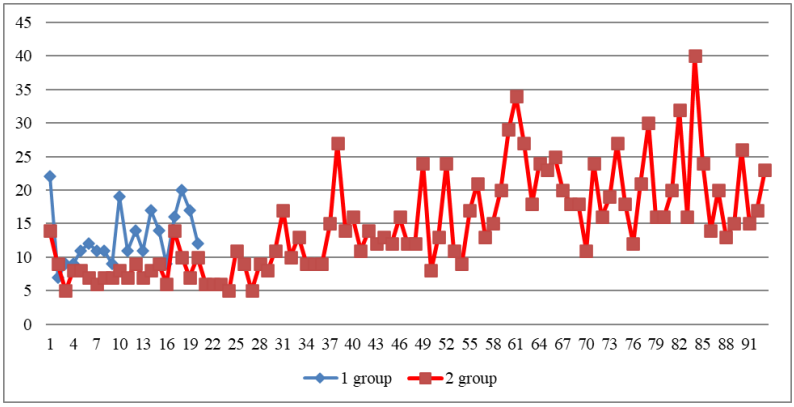

Figure 4. *Range of daily SV fluctuations, ml.*

Fluctuations in the daily SV fluctuations corresponded to changes in the amplitude of the circadian SV rhythm in both groups (Fig. 4).

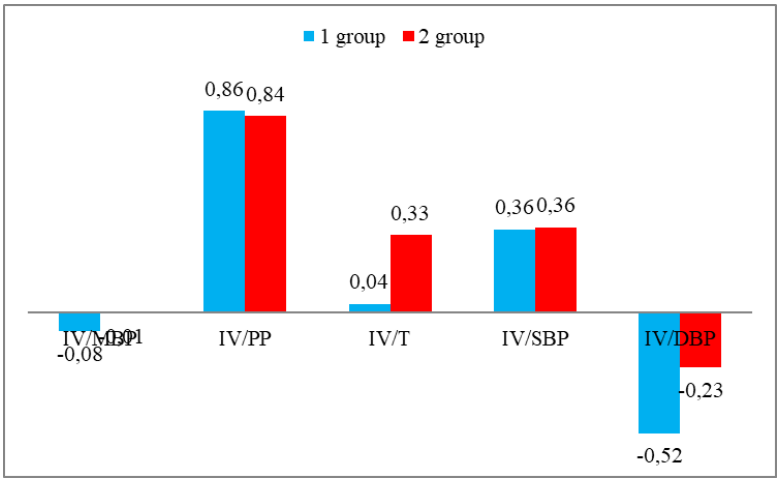

Figure 5. *Correlation links of the mesor of the circadian rhythm of the stroke volume*

The increase in the mesor of the circadian rhythm of the stroke volume corresponded to the growth of the mesor of the circadian rhythm of the DBP both in group 1, amounting to 0.86; and in group 2, the direct correlation link of the studied hemodynamic parameters corresponded to 0.84 (Fig. 5). Thus, in children with an infectious disease complicated by the development of acute cerebral failure at the age of up to 3 years, the DBP indicator strongly correlated with the stroke volume indicator, and corresponded to a change in cardiac output. While the analysis of the correlation link of the average circadian rhythm made it possible to detect, along with the direct dependence of the stroke volume and DBP indicator, a strong inverse relationship between the dynamics of the stroke volume and DBP, which amounted to (-0.82) in group 1 and (-0.7) in group 2. That is, a noticeable tendency to increase cardiac output with a decrease in DBP in group 1 (9-0.82), in group 2 (-0.7) was detected. In addition, a tendency in group 1 (-0.68) and a reliably significant inverse relationship were found between the SV and MAP indicators (-0.9) against the background of mechanical ventilation (Fig. 6). A decrease in body temperature had a stimulating effect on cardiac output in children of group 2 (-0.7). Thus, the method for assessing the correlation relationships of average circadian rhythms of the studied indicators is more informative than the methods for assessing the adaptive restructuring of hemodynamics in the circadian rhythm.

Additional signs of a favorable effect of mechanical respiratory support on cardiac function in ACI in children under 3 years of age were revealed.

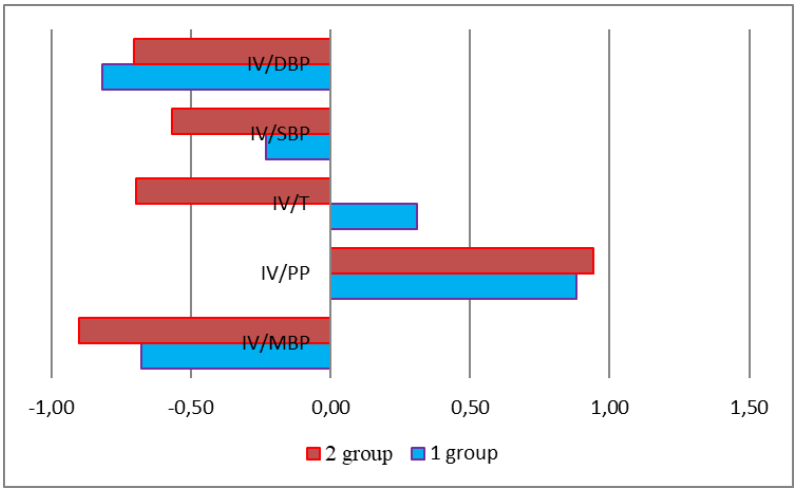

Figure 6. *Correlation relationships of the average circadian rhythm of SV*

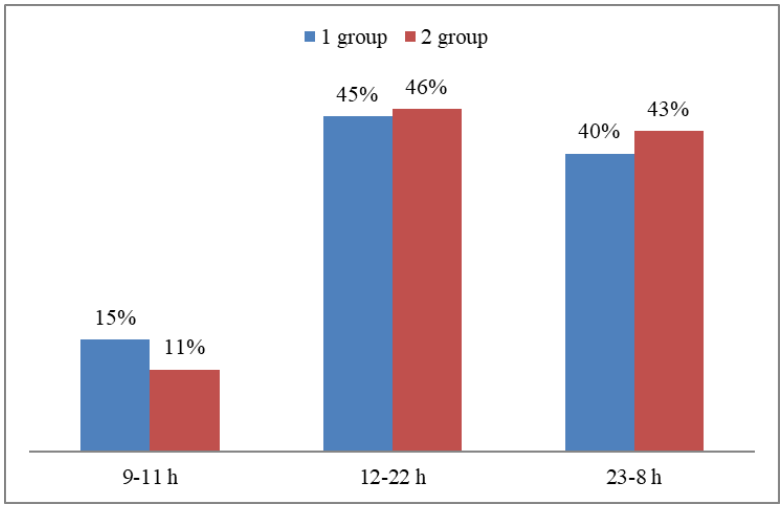

Figure 7. *Duration of inversion of the circadian rhythm of SV*

The duration of inversion of the circadian rhythm of SV in group 1 children was 40%, in children of group 2 - 43%. The conducted hardware respiratory sup-

port did not significantly affect the duration of inversion of the circadian rhythm of stroke volume in ACI.

Conclusion. A significant tendency to increase the meso of the circadian rhythm of stroke volume in children with ACI was revealed in group 1 than in group 2 by 24%. ALV did not have a significant effect on the parameters of stroke volume in the acrophase, bathyphase, on the amplitude, the range of oscillations of cardiac output per day. In both groups, inversion of the circadian rhythm of stroke volume was revealed. The conducted hardware respiratory support did not significantly affect the duration of inversion of the circadian rhythm of stroke volume in ACI. The method of assessing the correlation links of the average circadian rhythms of the studied parameters is more informative than the methods of assessing the adaptive restructuring of hemodynamics in the circadian rhythm. Additional signs of the beneficial effect of mechanical respiratory support on cardiac function in children under 3 years of age with acute cerebral insufficiency were revealed.

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DOI 10.34660/INF.2024.10.76.077

在 2.1 牙区进行单阶段植入，术中制作个性化龈袖整形器
SINGLE-STAGE IMPLANTATION IN THE TOOTH AREA 2.1 WITH INTRAOPERATIVE MANUFACTURE OF AN INDIVIDUAL GINGIVAL CUFF SHAPER

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注释。目前，立即植入假牙被认为是替换有拔牙指征的牙齿的侵入性最小且最快的方法；但是，以临时假牙修复体（牙冠）的形式立即负重并不总是可行或有指征的。在这些情况下，可以使用创新方法在术中制作定制愈合基台来保留软组织轮廓，从而无需重复手术安装愈合基台 （HA） 并使用临时修复体形成假体结构附近粘膜的自然轮廓。

关键词：外科牙科、单阶段植入、定制愈合基台。

Annotation. *Currently, immediate implant placement is considered the least invasive and fastest approach to replacing a tooth that has an indication for extraction; however, immediate loading, in the form of a temporary prosthetic restoration (crown), is not always possible or indicated. In these cases, an innovative approach with intraoperative fabrication of custom healing abutment can be used to preserve the soft tissue contour, eliminating the need for repeated surgery to install a healing abutment (HA) and the use of temporary restorations to form a natural-looking contour of the mucosa adjacent to the prosthetic structure.*

Keywords: *surgical dentistry, one-stage implantation, custom healing abutment.*

One of the most challenging tasks in modern implantology is to achieve a natural-looking aesthetic result. The key to achieving this is maximum preservation or reconstruction of the hard and soft tissues around the implant[1].

Current recommendations for implant treatment are based on the assessment of implant and prosthetic restoration survival, esthetics of the gingival area, frequency of mechanical complications (suprastructure fractures, chipping or fractures of materials, implant fractures), as well as the bone level and health of the surrounding soft tissues. The tissues surrounding the implant differ from the tissues surrounding the teeth in that there is no periodontium around the implants, which disrupts the nutrition of the hard and soft tissues of the body surrounding the installed implant. As a result of the disappearance of hard tissues, the level of the interdental papilla shifts in the apical direction, which is associated with an unsatisfactory aesthetic treatment result.

Standard prefabricated gingival cuff formers have a round cross-section. They are produced in various sizes and heights and are usually made of titanium type 5 (Ti-grade 5). The round cross-section of the HA and the absence of an internal index allows it to be fixed in the implant in any position. The round shape of the HA makes the healing of soft tissues around it more unpredictable if the goal is to form soft tissues aesthetically similar to the tissues around adjacent teeth. To obtain a satisfactory aesthetic effect of the soft tissues around the implant, an individual HA should be used in a shape as close as possible to the future permanent restoration.

The simplest and fastest way to manufacture an individual gingival cuff former is the direct intraoral method, in which the HA is modified from PEEK, manufactured at the factory, using a flowable composite, filling the space of the marginal edge of the socket. As a result, we obtain a gingival former that repeats the gingival contour of the extracted tooth (Fig. 4). The aim of the study: to highlight a clinical case of one-stage implantation with the production of an individual gingival cuff former in order to achieve a natural-like state of peri-implant soft tissues.

Materials and methods

Patient M., 35 years old, diagnosed with a longitudinal root fracture of tooth 2.1, the crown of the tooth was restored using a packable composite, which has now changed color.

It was decided to use the one-stage implantation technique [2] with the production of an individual HA. Cone-beam computed tomography (CBCT) was preliminarily performed, measurements were taken in the mesio-distal, vestibulo-oral and apical-coronal directions (Fig. 1, Fig. 2).

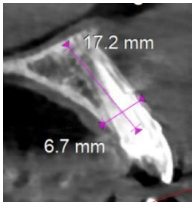

Figure 1.

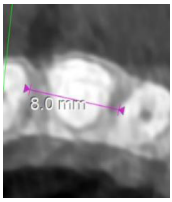

Figure 2.

Figure 3.

The operation was performed on an outpatient basis. Tooth 2.1 was extracted due to a longitudinal root fracture with minimal trauma to the surrounding soft and hard tissues [3, 4] (Fig. 5, Fig. 6, Fig. 7, Fig. 8). The implant bed was formed using cutters, the bed was shifted orally [5] (Fig. 9). The implant was installed with a resistance of 25 N/cm [7, 8] (Fig. 10). PEEK HA was installed, a cofferdam was applied (Fig. 11). HA was individualized using a flowable composite (Fig. 12). HA was removed, xenogenic bone substitute material (BioOss) was placed in the space between the vestibular bone wall and the implant, and de-epithelialized SDT was vestibularly fixed [6] (Fig. 13, Fig. 14). Non-resorbable sutures Resopren 6/0 were applied (Fig. 15, Fig. 16). The postoperative period proceeded without complications and peculiarities, the patient received antibacterial, anti-inflammatory and desensitizing therapy. The sutures were removed on the 7th day.

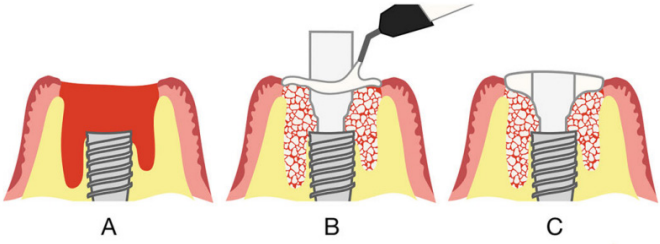

Figure 4.

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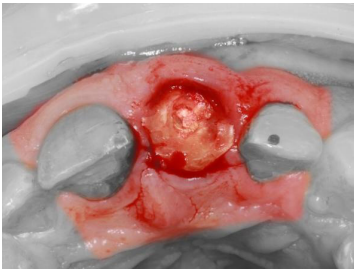

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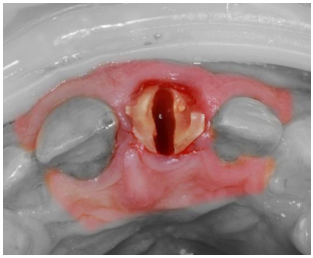

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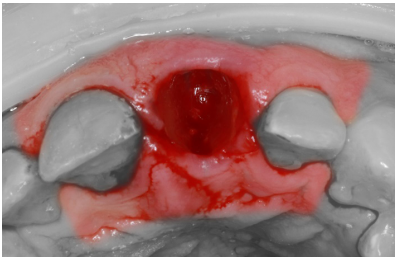

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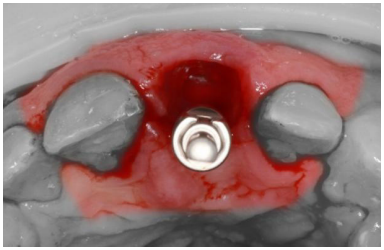

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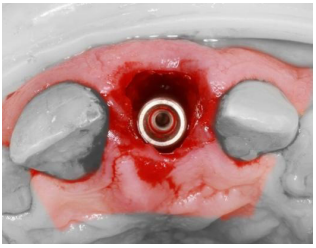

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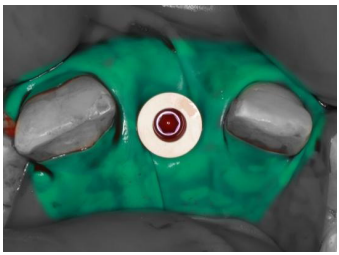
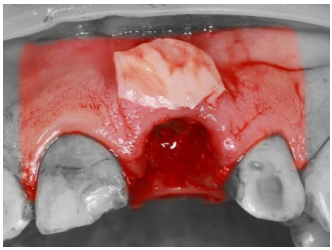


Figure 11.

Figure 12.



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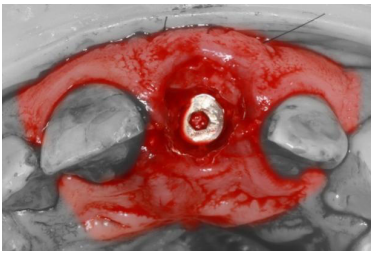

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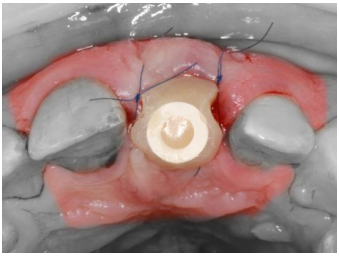

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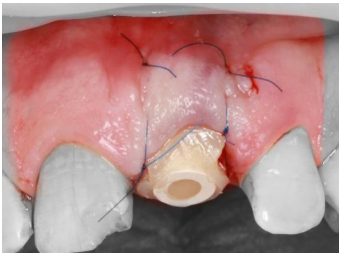

Figure 16.

Results and discussion

To achieve success in implant treatment, it is essential to understand the importance of proper design and emergence profile of the permanent restoration (crown) on the implant. We can control tissue healing around the implant by individualizing prosthetic elements such as HA and permanent abutments. By using such solutions, the tissue healing process can be planned and becomes more predictable, which leads to a better esthetic result.

In an effort to achieve the best match to the natural presentation, we must get as close as possible to the physiological anatomy of the dental and surrounding structures. The use of standard prefabricated gingival cuff formers is an unpredictable technique, since in many cases it leads to a less than ideal esthetic result.

This technique is one of the ways to solve the problem of the impossibility of achieving primary board stability of the implant [7,8] (more than 35 H\cm), which does not allow the production of a temporary orthopedic restoration (crown). The emergence profile of the individual former completely replicates the gingival contour of the extracted tooth, which provides an esthetic result comparable to a temporary crown in terms of maintaining the contour and quality of soft tissues.

Conclusions

The use of an individual gingival former was apparently an appropriate solution for supporting and maintaining the contours of soft and hard tissues after immediate implant placement. This approach can positively affect the long-term health of the implant, while simplifying the overall treatment, since the intraoperative fabrication of an individual HA takes a short period of time. The decision to use the proposed approach should be made taking into account the goals of a particular case, as well as clinical indications.

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使用光纤微传感器测定废水质量

DETERMINATION OF WASTEWATER QUALITY USING A FIBER-OPTIC MICROSENSOR

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摘要。基于折射率测量，光纤折射法在确定废水质量方面的应用已得到证实。提出了一种光纤微传感器，其主要元件是输入和输出光纤，两者之间有一个管状圆柱形比色皿，比色皿内有液体，其折射率携带有关其质量的信息并被测量。所提出的微传感器的使用有助于提高废水质量测量的测量精度和速度。

关键词：测量、光纤微传感器、折射率、折射法、废水、圆柱形比色皿。

Abstract. *The application of a fiber-optic refractometric method for determining the quality of wastewater based on the measurement of refractive indices is substantiated. A fiber-optic microsensor is proposed, the main elements of which are incoming and outgoing optical fibers, between which there is a cylindrical cuvette in the form of a tube, inside which there is a liquid, the refractive index of which carries information about its quality and which is measured. The use of the proposed microsensor helps to improve the measurement accuracy and speed of wastewater quality measurement.*

Keywords: *measurement, fiber-optic microsensor, refractive index, refractometric method, waste water, cylindrical cuvette.*

Introduction. The use of circulating and closed water supply systems helps to reduce the consumption of fresh water. In the case of recycled water supply, the necessary wastewater treatment, cooling of recycled water, treatment and reuse of wastewater are provided [1]. To prevent biological fouling of devices, the content of organic substances and compounds of biogenic elements, which are a nutrient medium for microorganisms, is limited in recycled water.

Wastewater is contaminated with various substances: biologically unstable organic compounds, inorganic salts, petroleum products, biogenic compounds, substances with toxic properties, biologically rigid non-degradable organic synthetic compounds, etc. [2-4]. The analysis of untreated wastewater helps to identify the type and amount of impurities, the degree of their contamination. Analysis of wastewater from enterprises allows you to identify the degree of contamination of water after the production cycle, and shows whether it can be reused or for technical purposes. In addition, the study of the company's wastewater is used to assess the quality of sewerage, purification and sanitation systems [5, 6].

Among the various methods of analysis, optical methods have become the most widespread [7, 8]: emission spectral analysis; methods of absorption spectral analysis in the ultraviolet, visible and infrared regions of the spectrum; analysis by Raman spectra based on the study of the phenomenon of scattering of light rays; turbidimetry based on measuring the amount of light absorbed by cloudy solutions; nephelometry based on the use of the phenomena of reflection or scattering of light by particles suspended in solution; luminescent or fluorescent analysis based on the fluorescence of substances irradiated with ultraviolet light and measuring the intensity of visible light emitted by them; flame photometry based on spraying a solution of the analyzed substance in a flame by means of a sprayer, releasing radiation characteristic of a given element and measuring the intensity of this radiation.

Of the optical methods, the most widely used are refractometric methods for determining the quality or composition of a liquid by refractive indices.

A number of refractometric methods for determining the refractive index of a liquid are known [9-12]. In particular, a refractometric method for determining the refractive index of a liquid has been widely used, based on the passage of light through two prisms, between the hypotenuse faces of which several drops of the liquid under study are placed, the refractive index is determined along the interface between light and shadow observed in the telescope [9]. But in this case, measurements of the limiting angle are carried out along the boundary of light and shadow, which is not clear enough for high-precision measurements, and this leads to an error in determining the refractive index.

A refractometric method for determining the refractive index of a liquid is known, based on using the dependence of the refractive index of a binary mixture, which is poured into a thin-walled prismatic cuvette or into a prismatic recess in a material with a known refractive index and the desired refractive index is determined by the angle of deflection of the beam [10].

Disadvantages of the known method:

- low sensitivity and low measurement accuracy, since the coefficient difference of 0.04 can only be recorded with high accuracy using complex hardware that is not suitable for accurate express analysis;

- long measurement time due to the need to place liquid in prisms.

A method for measuring the refractive index is known, based on the phenomenon of total internal reflection on the plane of contact of the substance under study with an optical element [11].

Disadvantages of the known method:

- measurements of the limiting angle are carried out along the boundary of light and shadow, which is not clear enough for high-precision measurements, and this leads to errors in determining the refractive index.

The refractometer, the main element of which is an immersion probe, has received the greatest practical application. The radiation from the LED is transmitted through a fiber-optic bundle to the input face of the working prism of total internal reflection, the reflected stream through the lens and the fiber-optic bundle is transmitted to the CCD ruler, where the light-shadow boundary is formed on the working face of the optical prism in contact with the solution under study [12].

Disadvantages of the device:

- very large overall dimensions, including prisms, which, in turn, requires a large amount of analyzed liquid;

- to ensure high measurement accuracy, it is necessary that the corners of the prism be made with high precision, and the faces must be polished with a tolerance not exceeding a quarter of the wavelength of the radiation source, which significantly reduces the manufacturability of the device design;

- the relative area of the shadow is calculated in relation to the ratio of the unlit photosensitive elements of the CCD matrix to their total number, which can lead to large additive errors due to unpredictable deviations of the luminous flux due to inaccurate alignment of a rather complex optical system.

In connection with the above, new approaches are needed to determine the quality or composition of wastewater using refractometric measuring transducers, in which the listed disadvantages should be eliminated.

The aim of the work is to develop high-precision fiber-optic microsensors of a new design for rapid analysis of aqueous media.

Methods and approaches. The criteria for choosing the method and measuring instrument are as follows: measurement accuracy; functionality, that is, the compliance of the capabilities of the measuring instrument with the user's requirements; time spent on the analysis; easy handling of the device; minimization of the mass and dimensional dimensions of the measuring instrument; reliability of the measuring instrument; the service life of the device; cost [13]. To achieve this goal, a refractometric fiber-optic microsensor has been proposed [14].

Results. Figure 1 shows a simplified design of the developed fiber-optic microsensor, which contains a transparent cylindrical cuvette in the form of a tube 1 with a transparent analyzed liquid 2.

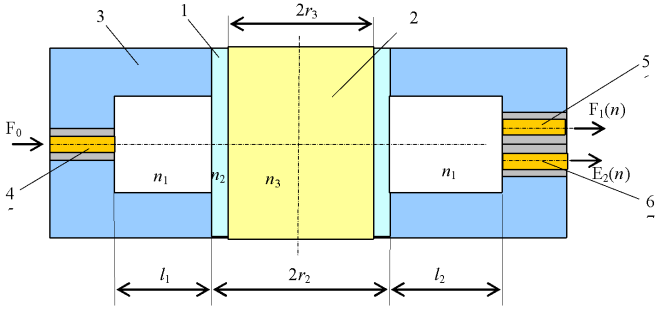


Figure 1. *Simplified design of the new fiber optic microsensor*

The tube with liquid is mounted in a housing 3, in which the supply optical fiber 4 is located with a certain gap l_1 relative to it and the discharge optical fibers 5 and 6 are located with a certain gap l_2. Moreover, the optical axis of the supply optical fiber 4 is perpendicular to the longitudinal axis of the tube 1 and passes at a point as far as possible from the optical longitudinal axis of the tube. The optical axes of the outgoing optical fibers 5 and 6 are located coaxially to the optical axis of the incoming optical fiber 4.

The receiving end of the incoming optical fiber 4 is docked with an LED (not shown in the figure) [15]. The radiating ends of the diverting optical fibers 5 and 6 are docked with photodiodes (not shown in the figure).

The external and internal rays of light at the outlet of the radiating end of the supply optical fiber 4 are directed to a tube with a liquid, the quality of which must be determined. The light rays fall on the surface of the tube 1 at the angles α_1 and α_2 (Figure 2).

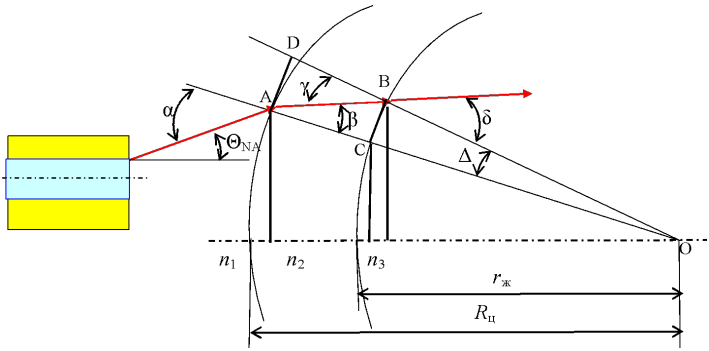


Figure 2. *Light flux transformations at the boundaries of the media of a fiber-optic measuring transducer (at the inlet to the tube)*

In accordance with Snellius's law, these rays are refracted (point A), since the refractive coefficients of the tube material 1 and liquid 2 are different.

Further, at angles β_1 and β_2, the refracted rays pass through the tube material and fall on the inner surface of the tube 1 at angles γ_1 and γ_2 (point B). Since the tube material is denser, its conversion coefficient n_2 is greater than the refractive index of the air n_1 located between the end of the supply optical fiber and the tube 1.

At the entrance to the liquid, the light rays are refracted at angles δ1 and δ2, pass through the liquid 2, fall a second time on the opposite inner surface of the tube 1 at angles δ_1 and δ_2 (point B) (Figure 3).

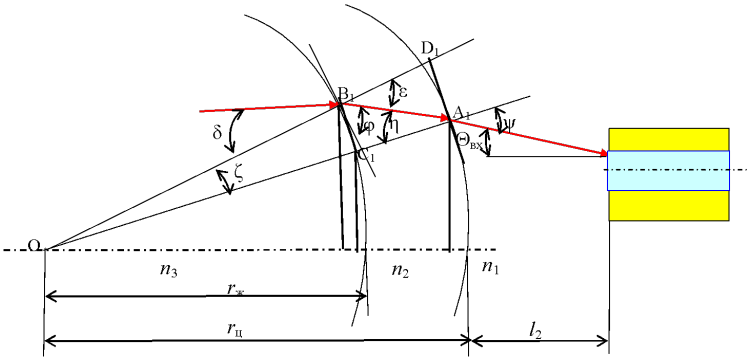
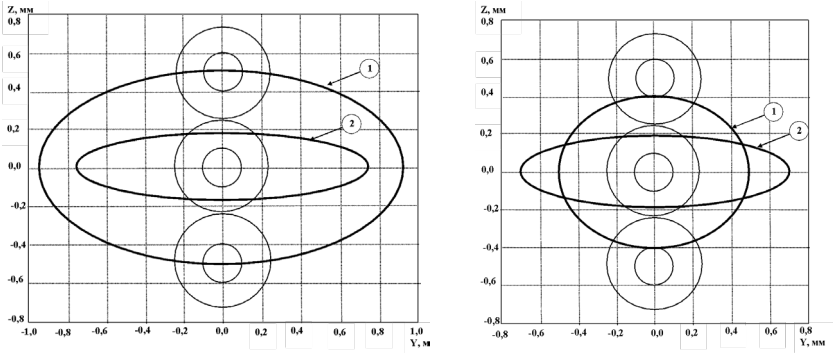


Figure 3. *Light flux transformations at the boundaries of the media of a fiber-optic measuring transducer (at the outlet of the tube)*

Here they are refracted at angles ε_1 and ε_2, enter the second outer surface of the tube 1 at angles φ_1 and φ_2 (point A1), then they are refracted on the opposite outer surface of the tube at angles ψ_1 and ψ_2. At the outlet of the tube, the rays go in the direction of the diverting optical fibers 6 and 7 and arrive at their receiving ends at angles $\Theta_{entrance1}$ and $\Theta_{entrance2}$, respectively.

The upper part of the luminous flux enters the upper diverting optical fiber 5 to the first photodiode, the lower part of the luminous flux through the lower diverting optical fiber 6 enters the second photodiode. The optical signals on the photodiodes are converted into electrical signals.

The image of the radiating end of the incoming optical fiber 5 in the plane where the receiving ends of the outgoing optical fibers 6 and 7 are located changes its contour and, accordingly, the area when the refractive index of the liquid changes (Figure 4).



a) *b)*

Figure 4. *Is an image of the radiating end of the incoming optical fiber 5 in the plane where the receiving ends of the outgoing optical fibers 6 and 7 are located at different refractive coefficients n_3, where 1 is the outer contour of the luminous flux, 2 is the inner contour of the luminous flux*

By changing the signals from the output of the radiation receivers, the refractive index of the liquid n_3 is determined by the formula: $n_3=k_0 n_0$, where k_0 is the proportionality coefficient equal to the ratio of the signal level from the output of one of the photodiodes in the presence of a calibration liquid in the tube (for example, distilled water) to the signal level of the same photodiode in the presence of wastewater in the tube with the measured the refractive index is n_3.

The parameters of the microsensor are related by expressions [14]:

$$\Theta_{\text{BX}} \approx \psi + \arcsin\left[\frac{(l_2 + \frac{2r_{\text{C}}}{tg\Theta_{\text{NA}}})\sqrt{2(1-\cos\psi)}}{r_{\text{Ц}}}\right] \le \Theta_{NA}, \quad (1)$$

where $\psi=f(n_1, n_2, n_3, r_1, r_2, l_1)$, where n_1, n_2, n_3 are the refractive coefficients of the medium between the optical fibers and the outer surface of the tube, the tube material, the liquid inside the tube; r_1, r_2 are the outer and inner radii of the tube.

In order to achieve the maximum difference in the values of optical signals between the calibration liquid and the wastewater, the refractive index of which is measured, it is necessary to position the diverting optical fibers so that the optical rays enter the diverting optical fibers at angles $\Theta_{\text{entrance 1}}$ and $\Theta_{\text{entrance 2}}$ not exceeding the aperture angle of the optical fiber Θ_{NA}, that is:

$$\Theta_{\text{entrance 1}} \le \Theta_{NA} \text{ and } \Theta_{\text{entrance 2}} \le \Theta_{NA}, \quad (2)$$

The use of two diverting optical fibers makes it possible to implement two-channel conversion of optical signals, which reduces additional errors from the

influence of external influencing factors (for example, from bends of optical fibers, changes in the power of the radiation source with temperature changes, etc.) [15, 16].

The proposed fiber-optic measuring converter, which implements a new refractometric method of signal conversion, allows:

- to increase the sensitivity of optical signal conversion, provided by reducing the loss of luminous flux in the micrometric optical path;
- improve the accuracy of the refractive index measurement;
- simplify the design and adjustment procedure of the optical converter system;
- to increase the manufacturability of the design of the measuring transducer;
- reduce the weight and size characteristics of the measuring transducer;
- to carry out an express analysis of the composition of wastewater.

The scientific significance of the work consists in:

1) increasing the reliability of diagnostics of the quality of liquid media, both of natural and man–made origin, through the use of optical diagnostic signs - changes in the refractive index of a liquid relative to standard samples of a specific type of liquid, which cannot be accurately and quickly determined by known measuring instruments and recorded by high-precision, highly sensitive fiber-optic refractometric microsensors of the IR range;

2) determination of the physico-technical, optical, mathematical and astrological patterns of functioning of fiber-optic microsystems and basic fiber-optic refractometric microsensors, the main elements of diagnostic systems and monitoring the quality of liquid media;

3) the development of optical, highly efficient environmental technologies.

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通过执行质量管理体系的要求来优化采购流程
OPTIMIZATION OF THE PROCUREMENT PROCESS BY IMPLEMENTING THE REQUIREMENTS OF THE QUALITY MANAGEMENT SYSTEM

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摘要。有效的采购管理在组织的成功运营中起着关键作用，使其能够以最少的时间和财务成本实现最大的利润。本文讨论了通过在 LLC“Regionstroy”组织中实施质量管理体系的要求来优化采购流程。

关键词：流程、采购、采购程序、供应、质量。

Abstract. *Effective в сфере procurement management plays a key role in the successful operation of an organization, allowing it to achieve maximum profit with minimal time and financial costs. This article discusses the optimization of the procurement process by implementing the requirements of the quality management system in the organization of LLC "Regionstroy".*

Keywords: *process, procurement, purchasing procedure, supplies, quality.*

The economy of any enterprise is highly dependent on the external environment, but not only the economy, but also the procurement process depends on this. This is due to the fact that enterprises began to use outsourcing to a greater extent, purchasing materials and components on the open market. This increases the dependence of enterprises on the external situation and on the behavior of suppliers.

The procurement process plays an important role in the development of any enterprise and has a major impact on such indicators of the enterprise's performance as efficiency, efficiency, overall competitiveness and sustainability. A lot will depend on how the process of planning and managing purchases is organized at the enterprise. Effective management of the procurement process will allow

businesses to get maximum profit at minimal cost. Also, this process will allow enterprises to get the resources they need for production in a timely manner. The procurement process usually includes such components as: planning purchases, managing relationships with suppliers, purchasing goods, materials, and services, and monitoring the execution of purchases. Based on this, we can say that the procurement process is "one of the key processes, the effectiveness and quality of which determines the competitiveness of the organization."

A process should be understood as "a set of interrelated and interacting activities that transform inputs into outputs" [1]. This definition is established in GOST R ISO 9001-2015. Managing an enterprise according to the principles of the process approach will prov idea number of advantages: increase the ability to focus efforts on key processes and opportunities for improvement; produce consistent and predictable outputs in the system of coordinated processes; optimize activities through effective process management, efficient use of resources and reduction of cross-functional barriers; ensure the confidence of stakeholders in consistency, efficiency and effectiveness and the efficiency of its activities [10]. Applying a process-based approach to procurement management will also allow you to get a number of advantages, namely, clearly plan the procurement process, monitor all stages of the process, evaluate the effectiveness of the process, based on key process indicators, which will allow you to identify bottlenecks and make timely decisions [2], [3]

The main requirements put forward for procurement activities are reflected in 44-FZ. According to this Federal Law, procurement should be understood as "procurement of goods, services and works, where the customer is an organization that purchases goods at the expense of budget funds allocated to it" [4]. This is the case when purchases are made at the expense of budget funds — federal, regional, or municipal.

In his writings, L. A. Bernstein reveals procurement as: "Procurement is the process of finding and agreeing on conditions, as well as purchasing goods, services or other works from an external source, often using the procedure of conducting maintenance or competitive bidding" [5].

Another definition that should be highlighted is "purchases are a subset of purchases that are specifically related to order in gand paying for goods and services" [6]. This definition was proposed by F. E. Webster in the article "General model of understanding organizational purchasing behavior" [7]. Another definition that I would like to reflect is that определениegiven by T. V. Alesinskaya in the work "Fundamentals of Logistics", where procurement is defined as" Procurement is a function responsible for purchasing all the materials needed by the organization " [10].

"Thus, analyzing all definitions, we can conclude that procurement is the process of" receiving goods, works or services, which consists in determining the

need for these goods, works and services, finding suppliers, concluding and executing a contract for the supply of goods (performance of works or services)"". "The procurement process is the activity of managing material flows in the process of supplying an enterprise with material resources: raw materials, materials, components, goods. It organizes all types of activities related to obtaining material resources and services from suppliers: procurement, delivery, acceptance, etemporary storage of material resources" [5]. It is also one of the most important stages in the product life cycle.

Let's consider the main stages of the procurement process, which are shown in Figure 1 [5].

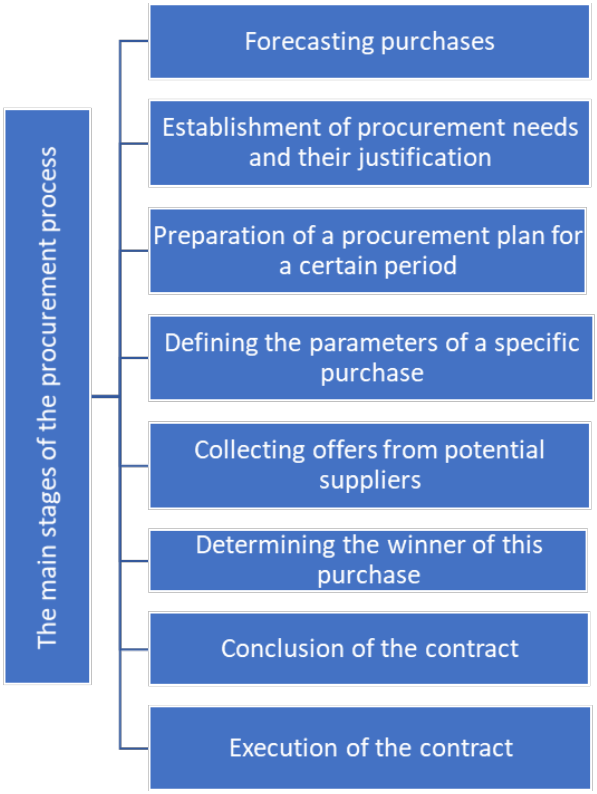

Figure 1. *Main stages of the procurement process*

"The quality Management System (hereinafter – QMS) is a part of the enterprise management system [5]. The standard GOST R ISO 9000-2015 contains the

following information in the part of the quality management system" [10]: The quality management system includes actions by which an organization sets its goals and determines the processes and resources required to achieve the desired results. A quality management system manages the interoperable processes and resources required to deliver value and deliver results to relevant stakeholders. The quality management system allows top management to optimize the use of resources, taking into account the long-term and short-term consequences of their decisions. The quality management system provides management tools for identifying actions in relation to intentional or unintended consequences in the provision of products and services" [10].

Thus, the system is aimed at meeting the requirements of consumers. The quality management system allows you to constantly, continuously improve your performance. The requirements for the quality management system are set out in GOST R ISO 9001-2015. If enterprises strictly follow the requirements set out in this standard, the success of the implemented quality management system will be ensured.

The quality management system is based on the basic principles that define the essence of the quality management system." The implementation of these principles provides the company's management with the basis for implementing "good" management activities. Each of the principles presented in Table 1 has its own place in the system, but the company will only get a positive effect if these principles are applied together.

Table 1

Principles of the quality management system

Principles of the quality management system	**Interpretation of requirements**
Customer orientation	Meeting all customer requirements and striving to exceed their expectations
Leadership	The direction of the organization's activities and the creation of conditions for achieving the organization's goals in the field of quality
Employee interaction	Competent, empowered and interacting employees at all levels of the organization enhance its ability to create value
The process approach	Consistent and predictable results are achieved more effectively and efficiently when activities are recognized and managed as interrelated processes that function as a coherent system.

Improvement	Maintaining and maintaining the current level of activity, responding to changes related to internal and external conditions and creating new opportunities
Evidence-based decision-making	Solutions based on the analysis and evaluation of data and information are more likely to produce the desired results.
Relationship Management	To achieve sustainable success, organizations manage their relationships with suppliers

It should be noted that the principles of the quality management system allow us to focus on system management, on the expectations and requirements of end users, on continuous improvement and thereby achieve the goals set and planned results of activities [2].

There are the main stages of implementing the quality management system at the enterprise: 1-analysis of the existing situation at the enterprise; 2-training of personnel to the requirements of GOST R ISO 9001-2015; 3 - development of documentation that meets the requirements of GOST R ISO 9001-2015; 4 – re-structuring of the work of employees of the enterprise;5-conducting audits of the quality management system" [10].

By implementing the quality management system in the way described above, enterprises will receive a number of advantages, including:

- the company's resources will be more focused on meeting the needs and expectations of consumers;

- optimization of processes in the management system;

- there is a development of documentation necessary for the production of safe, complete and high-quality products;

- consumption of internal resources by reducing the share of defects;

– obtaining a certificate gives the enterprise more chances to become a supplier for large international companies and multinational networks; - increasing the competitiveness of the enterprise" [10].

LLC REGIONSTROY is engaged in the construction of residential and non-residential buildings, and also provides a wide range of construction services, such as finishing works, concreting, installation and dismantling of structures, construction of engineering structures, including electrical and telecommunications networks.

Before optimizing the purchasing process in the organization under study, it is necessary to understand its essence. Process optimization should be understood as the process of improving an object or type of activity, or the process of an enterprise. This process is carried out by searching for shortcomings and eliminating them. The optimization process is used when the company needs to get rid of duplicate functions, reduce costs, shorten the production cycle, etc.

Let's analyze the main steps for proper optimization of the process.

The first step is to identify and analyze the process that needs to be optimized. In our case, this is just the procurement process. Next, you need to set performance and efficiency indicators. The third step will be to review the process. And, next, we need to monitor and measure the optimized process.

In order, to build these steps correctly, you need to apply one of the methods to optimize the process. Table 2 shows possible methods and a brief description of these methods.

Table 2

Main methods for optimizing the "Procurement" process

Name of the method	**Brief description**
Engineering	The purpose of engineering is usually the introduction of any innovative technologies. This measure will allow enterprises to update and form the technological base of production. Engineering is not only the introduction of new technologies, but also the improvement of existing ones.
Reengineering	The goal of reengineering is to completely change the cycles and processes that take place in the enterprise. Reengineering should allow businesses to optimize their current position. As part of reengineering, enterprises will be able to understand which processes should be abandoned and which ones should be implemented on the contrary.
Continuous improvement	Implies the introduction of some methods in stages, and not immediately for the entire enterprise. Processes are planned with improvements in mind. This process should be carried out at enterprises all the time.
Universal quality management	is a method that involves creating products that fully meet the expectations of consumers. At all stages of production, there should be total quality control. «The company should develop and implement documentation that meets the requirements of the quality management system» [2].

These methods allow you to correctly optimize the process and eliminate duplicate steps, change the sequence of actions and come to automation.

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耐腐蚀管道失效的原因
CAUSES OF FAILURES OF CORROSION-RESISTANT PIPELINES

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注释。本文讨论了用于输水管道以及石油和天然气输送的主要耐腐蚀管道类型。介绍了管道故障类型和管道故障的主要原因。

关键词：耐腐蚀管道、金属塑料管道、双塑料管道、柔性聚合物金属管道、内衬聚乙烯的钢管、聚合物涂层钢管、低压聚乙烯管道。

Annotation. *The article discusses the main types of corrosion-resistant pipes used for water pipelines, as well as for the transport of oil and gas. The types of pipe failures and the main causes of pipeline failures are shown.*

Keywords: *corrosion-resistant pipes, metal-plastic pipes, biplastic pipes, flexible polymer-metal pipes, steel pipes lined with polyethylene, steel pipes with a polymer coating, pipes made of low-pressure polyethylene.*

One of the main causes of failures of steel field pipelines is internal corrosion under the influence of aggressive pumped products. An alternative to steel pipes are corrosion-resistant [1-3]: metal-plastic pipes (MPP); biplastic pipes (BPP); flexible polymer-metal pipes (FPMP); steel pipes lined with polyethylene (SPLP); steel pipes with a polymer coating; pipes made of low-pressure polyethylene (HDPE). Therefore, it is urgent to comprehensively study the reliability of corrosion-resistant pipelines in order to ensure the industrial safety of hazardous production facilities where they are used [4-5], including through technical regulation of the production and operation of pipes in corrosion-resistant design [6-8]. This task is of industry-wide importance, since plastic parts are increasingly used,

including in oilfield equipment [9], which is also subject to the corrosive effects of liquids.

Failures of steel pipes occur, as a rule, due to corrosion failure, whereas the accident rate of corrosion–resistant pipes is the result of structural flaws and violations of technological processes of production and operation. The exception is steel pipes lined with polyethylene (SPLP), where failures due to external corrosion of the steel pipe account for about half of all failures.

Analysis of the dynamics of the accident rate of pipelines in corrosion-resistant design by year, it can be noted that the highest rate of specific accident rate is for flexible polymer-metal pipelines (FPMP). FPMP failures occur due to a decrease in the strength properties of the reinforcing elements of the pipe as a result of corrosion (Fig.1), as well as a deterioration in the mechanical properties of polyethylene compared to the initial values; part of the failures of FPMP are due to construction defects (Fig.2) and the violation of operating modes (overpressure) [1].

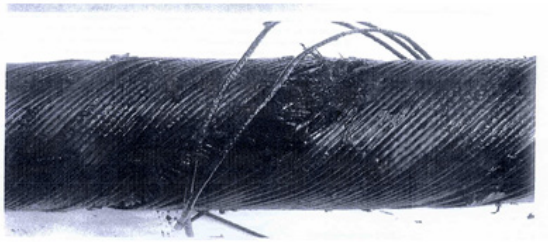

Figure 1. *Decrease in strength properties of FPMP metal cord in the process of corrosion*

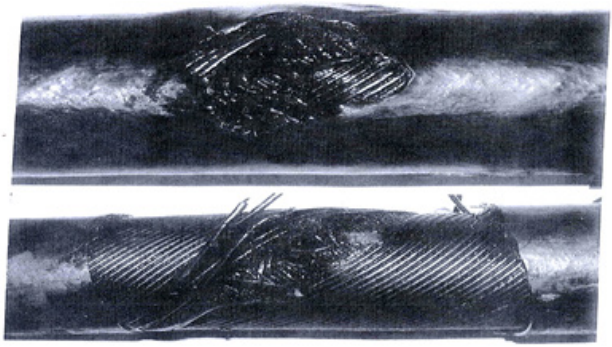

Figure 2. *Mechanical damage to the reinforcing elements of the FPMP*

Metal-plastic pipes (MPP) are made by extrusion from polymer materials (low-pressure polyethylene) with simultaneous reinforcement with a steel welded wire frame, followed by the design of endings for threaded, coupling or flanged connection of pipes to each other. At each intersection point, the longitudinal and spiral wires of the frame are welded by contact welding. The flange end is welded to the pipe using friction welding [1].

Metal-plastic pipes very often have hidden defects on the inner surface, which leads to the penetration of the transported medium to the reinforcement, its migration along the pipe of the drip manifestation of the outer surface of the pipe. As a result, metal fittings under the influence of the transported aggressive medium are subject to corrosion destruction by the mechanism of crevice corrosion, which significantly increases the overall corrosion. The detection (rejection) of pipes with defects during hydraulic testing is complicated by the fact that there is no objective assessment of the quality of pipes (pressure drop, leakage) even with prolonged loading of the pipe with internal test pressure.

Surveys of samples of metal-plastic pipes show that failures in most cases have subjective reasons – factory defects and violation of the rules of installation and operation.

Another type of combined pipes is biplastic pipes, which are thin-walled polyethylene pipes reinforced with an outer fiberglass shell (Fig.3).

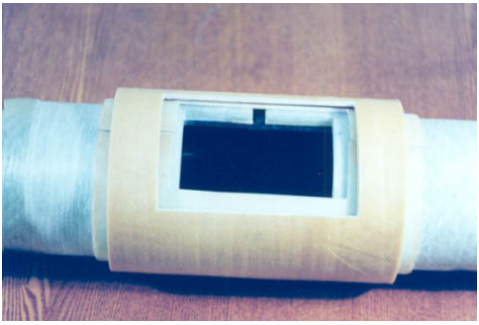

Figure 3. *Glue-welded connection of biplastic pipes*

Biplastic pipes have a barrier sealing polyethylene layer, in which defects may occur during installation and operation of pipelines. In addition, the fiberglass layer that takes on the workload is leaky, as well as quite fragile and can be stratified under the influence of external loads. Through a defect on the inner surface, the transported medium can reach the fiberglass layer, and here it is also possible to migrate the medium through the fiberglass layer, with access to the surface anywhere.

Studies show that steel pipes lined with polyethylene, which are in operation in the reservoir pressure maintenance system, tend to corrode due to the destruction of the tread sleeve. As the tread volume decreases, corrosion destruction of the tip occurs, which leads to the ingress of the transported medium into the inter-tube space and, as a result, to corrosion destruction of the body of the steel pipe (Fig.4).

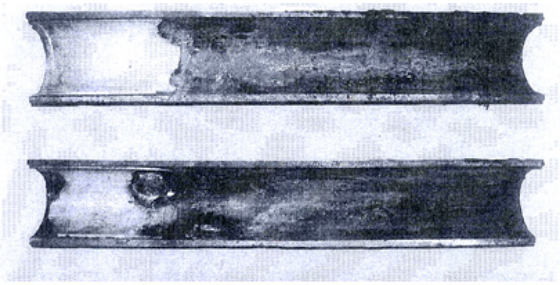

Figure 4. *SPLP samples*

It was found that in some cases, the cause of pipeline failures are structural defects of the SPLP, which led to failures due to internal corrosion. There were also cases of failures of the SPLP due to external corrosion of the steel pipe (Fig.5).

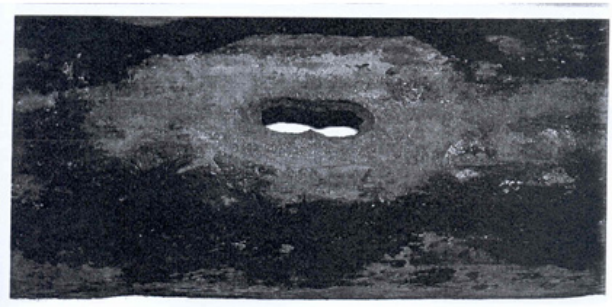

Figure 5. *Sample of SPLP destroyed due to external corrosion*

Investigations of SPLP failures due to the occurrence of internal stresses in the pipe body during calibration and crack formation during external corrosion showed that the failures occurred as a result of the absence or mechanical damage to the external insulation during construction and installation work.

In cases of internal corrosion of the steel pipe, it was concluded that as a result of deformation and rupture of the polyethylene shell, the pumped medium entered the inter-tube space, which caused corrosion destruction of the inner surface of the

pipe. In most cases, the cause of SPLP failures is the corrosive destruction of the outer surface of the steel pipe. It is also possible to note a small percentage of failures due to defects during construction work due to the lack of external insulation in the area of the welded joint.

To analyze the effects of various hydrocarbons (oil, petroleum products, associated gas) on low-pressure polyethylene pipes, experimental studies were conducted to determine the saturation distribution of the inner surface of polyethylene pipes with gas and gas condensate by removing removable coils previously installed on it from the existing pipeline, removing sections (chips) from their ends. The research was carried out in parallel with the chips removed from the new pipes.

0.25 mm thick sections of 160 mm diameter pipes with a wall thickness of 14.6 mm were superimposed on the electric heater and pressed against its surface with a load. After the necessary exposure at the welding temperature of polyethylene pipes, the test samples were removed and after cooling, visual inspection revealed that the samples taken from the coils of the existing gas pipeline had pores and swellings, and some samples taken from the new pipe showed a relief pattern in the form of a honeycomb package. A detailed examination of the samples under study showed that the honeycombs have a size of 2.5 mm on the inner surface of the pipes, about 2 mm on the outer, and by the middle of the wall thickness the pipes decrease and have a size of 1 mm in the middle of the sample (Fig.6).

Figure 6. *Pipe section after heating*

This indicates that during the manufacture of polyethylene pipes, the polymer melt, when passing through the mandrels and through the holes of the filter grate, does not receive a homogeneous connection of individual so-called flagella, but their sealing and welding occur with each other to form a honeycomb structure.

At the Bashkiria oilfield, from a batch of polyethylene pipes with a diameter of 160 mm received for the construction of a gas pipeline, 19 pipes (about 2 km in total) spontaneously collapsed along the pipe axis on storage racks (Fig.7).

Figure 7. *A sample of a spontaneously destroyed pipe*

Later, at NGDU "Suleyaneft" (Tatarstan), about 50 pipes from the batch of polyethylene pipes with a diameter of 315 mm received for installation of the conduit also collapsed along the generatrix. At the same time, the rupture of the pipes had a rectilinear character along the entire wall thickness with smooth edges of destruction.

It is obvious that the destruction of polyethylene pipes without external and internal influences occurs from internal thermoelastic stresses [10] along the interface of adjacent polymer melt flows formed by the fairings of the nozzle holder due to the fact that a complete homogeneous connection did not occur between them (adjacent flows).

The conducted studies show that in such cases, the walls of polyethylene pipes are anisotropic and annular (tangential) stresses are dangerous stresses, while the quality of pipes, according to standards, is assessed based on tests of samples cut along the pipe axis.

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尖形结构场阴极电动势分布问题的数学建模和求解
MATHEMATICAL MODELING AND SOLUTION OF THE ELECTRIC POTENTIAL DISTRIBUTION PROBLEM FOR A FIELD EMITTER WITH A SHARP-TIP STRUCTURE

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本研究致力于通过数学建模和分析研究电子发射系统中的物理场分布。通过结合拉普拉斯方程和泊松方程，提出了一个描述场发射系统中电场分布的模型，并通过分离变量法和傅里叶变换成功地得到了发射系统电势分布的解析解。

场电子发射、电势分布、拉普拉斯方程、泊松方程、边界值问题

Abstract. *This research is devoted to the study of the physical field distribution in electron emission systems through mathematical modeling and analysis. By combining Laplace and Poisson equations, a model describing the electric field distribution in a field emission system is proposed, and an analytical solution of the potential distribution of the emission system is successfully obtained by the method of separated variables and Fourier transform. The obtained results lay a solid theoretical foundation for more complex emission structures.*

Keywords: *Field electron emission, potential distribution, Laplace equation, Poisson equation, boundary value problem.*

1. Introduction

With the development of nanotechnology, field emission electronics has attracted attention due to its importance in the field of high-performance electronic devices and vacuum displays [1]. The phenomenon of field emission, which allows the efficient release of electrons due to the quantum tunneling effect, is of great importance for theoretical studies and applications. The shape and material of the field emission cathode directly affect its performance [3], and how to accu-

rately describe the potential distribution using mathematical modeling has become one of the priority areas of research.

In this study, based on the Laplace and Poisson equations, the potential distribution of a field emission cathode with tip structure [5] is solved using the method of separation of variables and Fourier transform. The results provide theoretical support for the optimization of the field emission system and can be extended to multilayer field emission structures to assist in the development of efficient and stable nanodevices [2].

The aim of this paper is to develop an accurate mathematical model for analyzing the electric field characteristics of field emission systems and to study the possibility of their application in modern nanotechnology [6]

2. Laplace's equation

2.1. Physical model

A diode system with an infinitely thin cathode on a flat substrate and an anode in the form of a plane parallel to the substrate of the cathode [8] is studied.

Figure 1 shows a schematic representation of a field diode system with a thin emitter in Cartesian coordinate system (*x, y*).

Task Parameters:

$x = 0, x = x_2$ — system boundaries on the variable x;

$x = x_1$ ($y \in [0, y_1]$) — cathode surface;

$y = 0$ ($x \in [0, x_2]$) — athode substrate surface;

$y = y_2$ ($x \in [0, x_2]$) — the surface of the anode.

The potential of the cathode and substrate is zero, and a constant potential u_0 is set at the anode. On the side surfaces of the system it is assumed that the potential is zero.

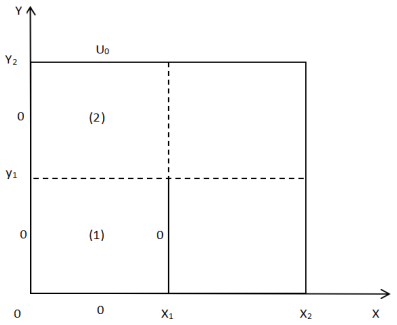

Figure 1. *Schematic representation of the diode system*

2.2. Mathematical model

$$\Delta u\,(x, y) = 0, \tag{1}$$

$$u(0, y) = 0, (y \in [0, y_2]), \quad (2)$$
$$u(x_2, y) = 0, (y \in [0, y_2]), \quad (3)$$
$$u(x_1, y) = 0, (y \in [0, y_1]), \quad (4)$$
$$u(x, 0) = 0, (x \in [0, x_2]), \quad (5)$$
$$u(x, y_2) = u_0, (x \in [0, x_2]), \quad (6)$$
$$x_1 = \frac{x_2}{2}. \quad (7)$$

To calculate the electrostatic potential distribution in the whole region of the system, it is required to solve the Laplace equation (1) with boundary conditions (2)-(6). The field system is symmetric about the plane, which is $x_1 = \frac{x_2}{2}$.

2.3. Problem solving

To solve the problem we use the method of separation of variables in the Cartesian coordinate system [4], by means of which the initial boundary problem is reduced to finding the unknown coefficients in the eigenfunction decomposition of the potential [9].

Since the potential distribution is symmetric about the plane $x = x_1$, so we can solve the problem in the region $0 < x < x_1$. In this case, $u(x, y) = u(x_2 - x, y)$.

The region of the system on the variable y ($0 \le x \le x_1$, $0 \le y \le y_2$) is divided into two subareas (see Figure 1):

Region 1 — $0 \le x \le x_1$, $0 \le y \le y_1$,

Region 2 — $0 \le x \le x_1$, $y_1 \le y \le y_2$.

Then, $u(x, y) = u_1(x, y)$ at $0 \le x \le x_1$, $0 \le y \le y_1$. And $u(x, y) = u_1(x, y)$ at $0 \le x \le x_1$, $y_1 \le y \le y_2$.

Figure 2 shows a schematic representation of region 1.

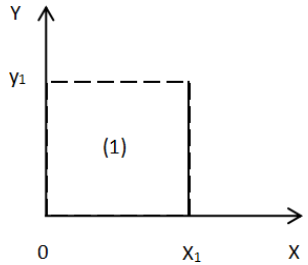

Figure 2. *Schematic representation of region 1*

According to the general boundary conditions (2)--(6), the boundary conditions in the domain of region 1 are given by formulas (8).

$$\begin{cases} u_1(x,0) = 0, \\ u_1(0,y) = 0, \\ u_1(x_1,y) = 0. \end{cases} \tag{8}$$

The potential distribution in region 1 can be represented as

$$u_1(x,y) = \sum_{n=1}^{\infty} a_n \frac{\mathrm{sh}\alpha_n y}{\mathrm{sh}\alpha_n y_1} \sin(\alpha_n x), \tag{9}$$

$$u_1(x,y_1) = \sum_{n=1}^{\infty} a_n \sin\alpha_n x, \tag{10}$$

$$\alpha_n = \frac{n\pi}{x_1}. \tag{11}$$

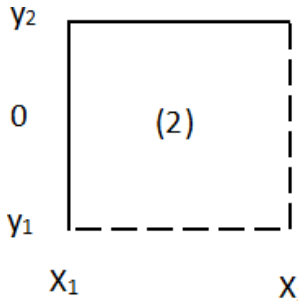

Figure 3. *Schematic representation of region 2*

Figure 3 shows a schematic representation of region 2.

$$\begin{cases} \left.\dfrac{\partial u_2(x,y)}{\partial x}\right|_{x=x_1} = 0, \\ u(x,y_2) = u_0, \\ u_2(0,y) = 0. \end{cases} \tag{12}$$

According to the general boundary conditions (2)--(6), the boundary conditions in region 2 are given by formulas (9).

According to the method of separation of variables, from the homogeneous boundary conditions we obtain:

$$\frac{\partial X}{\partial x}(x_1) = 0, \tag{13}$$

$$X(0) = 0. \tag{14}$$

When solving the Laplace equation (1), we obtain:

$$X(x) = A\cos\beta x + B\sin\alpha x, \tag{15}$$

$$A = 0. \tag{16}$$

Then the potential distribution in region 2 can be represented as

$$X'(x_1) = B\beta\cos\beta x_1 = 0 \Rightarrow \cos\beta x = 0, \tag{17}$$

$$\beta_m x_1 = \frac{(2m+1)\pi}{2} = u_1(y_1, x) \Rightarrow \beta_m = \frac{(2m+1)\pi}{2x_1}, \tag{18}$$

$$X_n(x) = \sin\left(\frac{(2m+1)\pi}{2x_1}x\right) = B\sin\beta_m x, \tag{19}$$

$$u_2(x,y) = \sum_{m=0}^{\infty}\left[b_m\frac{\mathrm{sh}\beta_m(y_2-y)}{\mathrm{sh}\beta_m(y_2-y_1)} + c_m\frac{\mathrm{sh}\beta_m(y-y_2)}{\mathrm{sh}\beta_m(y_2-y_1)}\right]\sin\beta_m x, \tag{20}$$

$$u_2(x,y_1) = \sum_{m=0}^{\infty} b_m\sin\beta_m x, \tag{21}$$

$$u_2(x,y_2) = \sum_{m=0}^{\infty} c_m\sin\beta_m x = u_0, \tag{22}$$

$$C_m = \frac{2}{x_1}\int_0^{x_1} u_0\sin\beta_m x\mathrm{d}x = \frac{4u_0}{(2m+1)\pi}. \tag{23}$$

Continuity conditions of the potential and its derivative on the boundary of regions 1 and 2:

$$u_1(x,y_1) = u_2(x,y_1), \tag{24}$$

$$u_1'(x,y) = u_2'(x,y). \tag{25}$$

The continuity of the potential and its derivative on the boundary of regions 1 and 2 leads to the system of linear algebraic equations (13) with respect to the unknown coefficients a_n and b_m in the expansions of the potential.

From (26) we obtain:

$$\sum_{n=1}^{\infty} a_n \sin \alpha_n x = \sum_{m=0}^{\infty} b_m \sin \beta_m x, \tag{26}$$

$$\frac{x_1}{2} a_n = \sum_{m=0}^{\infty} b_m \int_0^{x_1} (\sin \alpha_n x \sin \beta_m x) dx, \tag{27}$$

$$a_n = \frac{2}{x_1} \sum_{m=0}^{\infty} b_m \left(\frac{\cos(\pi(n+m))}{2(\alpha_n - \beta_m)} + \frac{\cos(\pi(n+m))}{2(\alpha_n + \beta_m)} \right). \tag{28}$$

From (27) we obtain:

$$\sum_{n=1}^{\infty} a_n \alpha_n \sin(\alpha_n x) \operatorname{cth}(y_1) = \sum_{m=0}^{\infty} \left[-b_m \beta_m \operatorname{cth}(\beta_m (y_2 - y_1)) + \frac{C_m \beta_m}{\operatorname{sh} \beta_m (y_2 - y_1)} \right] \sin(\beta_m x), \tag{29}$$

$$b_m = \frac{2}{x_1} \sum_{n=1}^{\infty} a_n \alpha_n \operatorname{cth}(\alpha_n y_1) \left[\frac{-\cos(\pi(n-m))}{2(\alpha_n - \beta_m)} - \frac{\cos(\pi(n+m))}{2(\alpha_n + \beta_m)} \right] - \frac{C_m \beta_m}{\operatorname{sh} \beta_m (y_2 - y_1)}. \tag{30}$$

As a result, we obtain a system of linear algebraic equations with respect to the unknown coefficients a_n and b_m in the potential expansions:

$$\begin{cases} a_n = \dfrac{2}{x_1} \displaystyle\sum_{m=0}^{\infty} b_m \left(\frac{\cos(\pi(n+m))}{2(\alpha_n - \beta_m)} + \frac{\cos(\pi(n+m))}{2(\alpha_n + \beta_m)} \right), \\ b_m + \dfrac{1}{2x_1} \displaystyle\sum_{n=1}^{\infty} a_n \frac{\alpha_n \operatorname{cth} \alpha_n y_1}{\beta_m \operatorname{cth} \beta_m (y_2 - y_1)} \left[\frac{\cos(\pi(n-m))}{2(\alpha_n - \beta_m)} + \frac{\cos(\pi(n+m))}{2(\alpha_n + \beta_m)} \right] = \\ = \dfrac{1}{\operatorname{sh} \beta_m (y_2 - y_1)} \times \dfrac{1}{\operatorname{cth} \beta_m (y_2 - y_1)} \times c_m = d_m. \end{cases} \tag{31}$$

2.4. Coefficient matrix

$$\mathrm{F}_1(n,m) = \frac{2}{x_1} \left(\frac{\cos(\pi(n-m))}{2(\alpha_n - \beta_m)} + \frac{\cos(\pi(n+m))}{2(\alpha_n + \beta_m)} \right),$$

$$\mathrm{F}_2(n,m) = \frac{2}{x_1} \frac{\alpha_n \operatorname{cth}(\alpha_n y_1) \left[\frac{\cos(\pi(n-m))}{2(\alpha_n - \beta_m)} + \frac{\cos(\pi(n+m))}{2(\alpha_n + \beta_m)} \right]}{\beta_m \operatorname{cth}(\beta_m (y_2 - y_1))}, \tag{32}$$

$$D_m = \begin{cases} 0, m \in \overline{1, N}, \\ -\dfrac{c_m \beta_m}{\operatorname{sh}(\beta_m (y_2 - y_1))} \dfrac{1}{\beta_m \operatorname{cth}(\beta_m (y_2 - y_1))}, m \in \overline{N+1, 2N}. \end{cases}$$

$$\begin{pmatrix} \begin{pmatrix} 1\,0\,0\cdots 0 \\ 0\,1\,0\cdots 0 \\ 0\,0\,1\cdots 0 \\ \vdots\,\vdots\,\vdots\,\ddots\,\vdots \\ 0\,0\,0\cdots 1 \end{pmatrix} & F_1 \\ F_2 & \begin{pmatrix} 1\,0\,0\cdots 0 \\ 0\,1\,0\cdots 0 \\ 0\,0\,1\cdots 0 \\ \vdots\,\vdots\,\vdots\,\ddots\,\vdots \\ 0\,0\,0\cdots 1 \end{pmatrix} \end{pmatrix} \times \begin{pmatrix} a_1 \\ a_2 \\ a_3 \\ \vdots \\ a_n \\ b_1 \\ b_2 \\ b_3 \\ \vdots \\ b_m \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ \vdots \\ 0 \\ D_0 \\ D_1 \\ D_3 \\ \vdots \\ D_{m-1} \end{pmatrix}$$

3. Conclusion

In this paper, a mathematical model of the potential distribution of field emission systems based on the Laplace and Poisson equations is established, and the electric field distribution characteristics of field emission cathodes with tip structures are successfully solved using the method of separation of variables and Fourier transform. The results not only confirm the realistic and accurate model, but also provide important theoretical support for optimizing the performance of field emission devices.

Through this study, the key role of the tip structure on the electric field concentration effect is clarified, and ideas for the design and analysis of multilayer field emitting devices with composite structure are proposed. In the future, further combination of nonlinear effects and advanced numerical modeling methods may provide a more complete solution to the problem of electric field distribution in complex multilayer structures, and help in the design of highly efficient and stable field electronic devices.

Thus, this study provides important support for theoretical research and practical applications in the field of electron emission, and its methods and results will be extended to more complex application scenarios in the future.

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