



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

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信任经济：可持续发展的一个因素
**ECONOMY OF TRUST: A FACTOR OF SUSTAINABLE
DEVELOPMENT**

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摘要。 本文探讨了信任经济的概念，强调了其在现代市场关系中的重要性。特别关注信任如何影响消费者和企业家的行为，并考虑了有助于信任形成和维持的因素。还讨论了与不信任和操纵相关的挑战以及在此背景下的商业机会。

关键词：信任经济、信任、市场关系、消费者行为、声誉。

Abstract. *The article examines the concept of the trust economy, emphasizing its importance in modern market relations. Particular attention is paid to how trust influences the behavior of consumers and entrepreneurs, and the factors that contribute to its formation and maintenance are considered. The challenges associated with mistrust and manipulation, and opportunities for business in this context are also discussed.*

Keywords: *trust economy, trust, market relations, consumer behavior, reputation.*

In the study of international economic relations, attention is increasingly focused on the role of trust, the lack of which is considered one of the causes of the global economic crises of the early 21st century. Even before these crises, measures to restore trust were proposed, and, for example, the World Economic Forum in Davos in 2003 was devoted to the topic of “Building Trust”. However, the steps taken were insufficient, and the ensuing economic downturn became a harbinger of the crisis and regression of integration processes, demonstrating their main vulnerability to increasing mistrust in the global economy. The topic “Economy of Trust” became one of the key topics at the St. Petersburg International Economic Forum (SPIEF) in 2024. The speakers discussed the connection between trust and other characteristics of society’s development: the level of economic well-being

and culture, the development of civilization, and discussed the consequences of high and low levels of trust in the economy and public life.

In these conditions, it is important to study both the factors that contribute to the emergence and maintenance of trust in international economic relations, and the reasons for its destruction. Although many studies focus on the importance of trust within individual companies, industries, clusters and national economies, the issues of the emergence and institutionalization of trust in international economic relations remain almost unexplored. Meanwhile, understanding the role of trust for the success of integration processes has obvious practical value.

Kenneth Arrow, winner of the Nobel Prize in Economics in 1972, noted: “Almost every commercial transaction contains an element of trust.” Distrust, he says, is extremely costly: it leads to an increase in the number of government oversight bodies, regulations and inspection bodies, has a negative impact on economic activity and significantly increases transaction costs. [6]

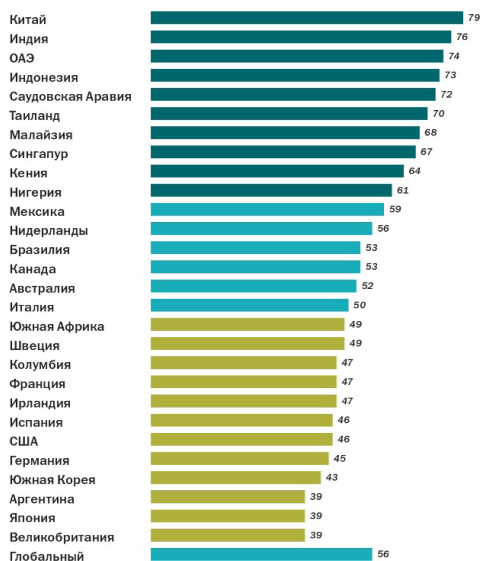
In the modern world, there is an active development of programs and organizations aimed at regional integration. This is especially noticeable in the example of Russia, which is more involved in regional integration processes than in global ones. The structures left over from the former Council for Mutual Economic Assistance (CMEA), such as the International Bank for Economic Cooperation and the International Investment Bank, which facilitate interaction between former CMEA members, are still in operation. The Economic Council, the Interstate Bank and other organizations supporting economic integration operate within the CIS.

Integration processes within the Union State of Russia and Belarus and the Eurasian Union are also actively discussed. Russia actively participates in the Eurasian Economic Community (EurAsEC), the Asia-Pacific Economic Cooperation (APEC), the Shanghai Cooperation Organization (SCO) and other regional projects that promote cooperation and economic integration. Russia’s participation in such regional integration processes has never been in doubt and is considered a beneficial economic strategy, which is confirmed by the opinions of scientists, politicians and businessmen. [1,16] Trust, both within the country and in the international arena, plays a vital role in the formation of strong and long-term relations. Internal trust between the branches of government and civil society contributes to stability and predictability, which strengthens Russia’s position in the international arena. On the other hand, a crisis of trust within the country can weaken its ability to effectively cooperate internationally, creating barriers to sustainable development.

In 2024, the Edelman Trust Barometer study was conducted in 28 countries, with a total of over 32,000 respondents surveyed. The results are interesting. Citizens of developing countries demonstrate a higher level of trust in business, government, media, and NCOs than citizens of developed countries. [6] In all countries, business deserves the highest level of trust (63%), while the media (50%)

and government (51%) deserve the lowest. For example, respondents believe that information about innovations and technologies can be trusted if it is reported by scientists or experts from specialized companies, but to a much lesser extent if it comes from the media or government officials.

Also, according to respondents, it is best to entrust the introduction of innovations into society to business (59%). Respondents are wary of innovation, citing inadequate government regulation, a lack of trust in political leaders, and concerns about the independence of science from lobbying. 53% of respondents worldwide say science has become politicized in their countries.



Респондентов просили оценить уровень доверия к бизнесу, правительству, НКО и медиа по 9-балльной шкале

● Недоверие (1–49) ● Нейтральная оценка (50–59) ● Доверие (60–100)



Респондентов просили указать, насколько по 9-балльной шкале они доверяют каждому из этих социальных институтов

● Недоверие (1–49) ● Нейтральная оценка (50–59) ● Доверие (60–100)

↑ (+1) Изменение с 2023 по 2024 г.

Figure 1. Trust Index - 2024 [6]

Russian President V.V. Putin emphasizes that Russia must be a strong and self-confident country striving for constructive interaction with the world community. It is important to note that such a position presupposes the development of democratic institutions and openness to the world, which is in harmony with the preservation of national identity and patriotism. Such an approach presupposes independent finding of solutions to current challenges of our time.

This attitude emphasizes the need for a thorough analysis of political trust, both at the level of relations between various branches of government, and between the state and civil society. A lack of trust within the country can undermine its position in the international arena, making it more vulnerable in international relations. On the other hand, excessive trust, especially when it becomes ideologically colored, can lead to the strengthening of authoritarian tendencies, which historically has a negative impact on the perception of Russia by democratic states. Such an imbalance in trust can weaken the country's international position, complicating its dialogue with external partners and reducing the level of mutual trust in the global arena. [2,88]

In the international arena, excessive and ideological trust in political leaders within the country, if it develops into authoritarian forms of government, can negatively affect the level of trust in Russia on the part of democratic states. This, in turn, complicates international cooperation and hinders sustainable development.

Thus, trust, both internal and international, is a necessary condition for the sustainable development of the country. Support for democratic institutions and openness to the world, which the president talks about, create a foundation for the formation of trust both within the country and in its foreign policy relations. It is on this foundation that it is possible to build strong, mutually beneficial and long-term partnerships that serve as the basis for the sustainable development of Russia in the modern world.

One of the striking examples of trust in international relations as a factor in sustainable development can be considered Russian-Chinese relations. In recent years, these relations have demonstrated significant progress, which is largely based on mutual trust between the states. Trust has become an important element in strengthening the strategic partnership, developing economic cooperation and ensuring security in the region.

Russian-Chinese relations have gone through stages of adaptation and strengthening since the collapse of the Soviet Union, but they have developed especially noticeably in the 21st century. After the signing of the Treaty of Good-Neighborliness, Friendship and Cooperation in 2001, relations between the two countries began to develop on the basis of mutual respect and trust, which became the basis for sustainable development in various areas.

Economic trust between Russia and China is manifested in a number of major projects and trade agreements. For example, in 2014, a historic contract was signed for the supply of Russian gas to China via the so-called “Power of Siberia”, a gas pipeline, the construction of which began that same year. The contract provides for the supply of 38 billion cubic meters of gas per year for 30 years, which became the largest deal in the history of Russian-Chinese relations. This contract was based on long-term mutual interests and trust. Russia and China saw it as an important element in ensuring energy security and sustainable economic growth in both countries. The Power of Siberia project became a symbol of how trust can facilitate the implementation of large infrastructure projects that have a long-term impact on the economic development of the participating countries.

Political trust between Russia and China has also been strengthened through regular high-level meetings and coordination in international organizations. For example, the two countries actively cooperate within the Shanghai Cooperation Organization (SCO), where security and regional stability issues occupy a central place. Joint military exercises such as Ocean 2024 and Beibu/Interaction 2024, where Chinese and Russian troops participated, have also become an expression of trust in the security sphere [5]. In 2021, Russia and China signed a roadmap for military cooperation for 2021-2025, which confirms the desire of both countries to strengthen trust-based relations in the military field. This document defines areas of cooperation in the field of defense, including joint exercises, information exchange, and military technologies. Thus, trust between Russia and China in the military sphere has become an important factor in ensuring regional security and sustainable development. [3,44]

Trust between Russia and China promotes sustainable development not only in bilateral relations, but also in a broader regional context. Joint projects in energy, infrastructure and security create conditions for stable economic growth, increase security and promote regional integration.

For example, the Belt and Road Initiative, in which Russia plays a key role, is based on mutual trust and cooperation between the countries. This initiative includes the development of infrastructure, transport corridors and trade ties, which promotes sustainable development not only in Russia and China, but also in other countries of Eurasia.

This strengthening of Russian-Chinese relations is demonstrated by the increase in trade turnover between the countries, shown in Figure 2.

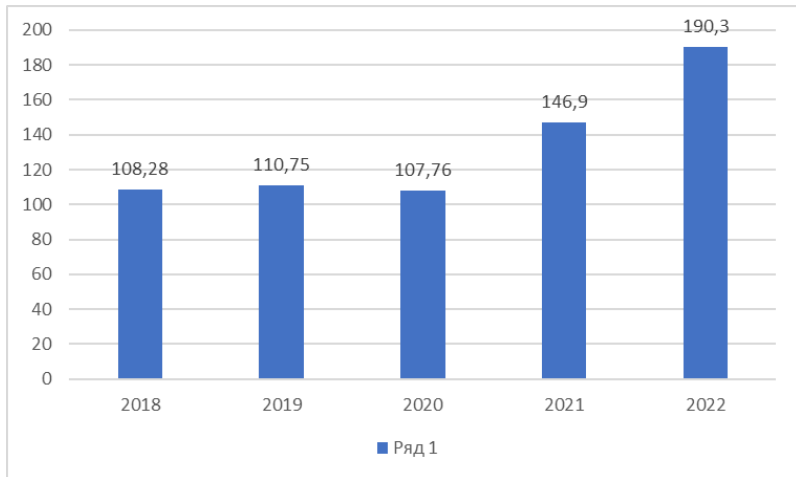


Figure 2. Trade turnover between Russia and China for the period 2018-2022, billion dollars [3.40]

Thus, in the period from 2018 to 2022, there is a steady growth trend in trade turnover between Russia and China. If in 2018 the volume of trade operations amounted to \$108.28 billion, then by 2022 it had grown to \$190.3 billion. This is an increase of more than 75%, which indicates an intensification of bilateral economic cooperation.

In 2019, there was a slight slowdown in growth (an increase from \$108.28 to \$110.75 billion), which can be associated with international tensions and global uncertainty caused by trade wars and sanctions. However, even under these conditions, Russian-Chinese relations have maintained positive dynamics.

In 2020, amid the COVID-19 pandemic, trade between the countries slightly decreased to \$107.76 billion. This decline was due to global economic shocks, supply chain disruptions, and reduced demand. However, unlike many other trading partners, Russia and China were able to quickly restore and significantly strengthen their trade ties in the following years. It is also worth noting that in 2021, trade turnover increased sharply to \$146.9 billion, indicating recovery and even exceeding pre-crisis levels. In 2022, growth continued, and trade volume reached a record \$190.3 billion. On December 19, 2024, Russian President Vladimir Putin stated that the volume of trade between Russia and China currently amounts to \$220–240 billion. The head of state called this Russian-Chinese trade turnover very good, specifying that it continues to grow, and this growth by the end of the year, according to his data, will amount to 3%. [7] This sharp jump can be explained by a number of factors, including the strengthening of energy coop-

eration (an increase in Russian energy exports to China) and deepening integration within the framework of a strategic partnership.

Consequently, the analyzed period is characterized by a significant strengthening of economic interaction between Russia and China. The growth of trade turnover, despite external and internal economic challenges, indicates the strategic nature of these relations. Both countries continue to develop economic cooperation, relying on mutual trust and common interests, which contributes to the sustainable development of their economies.

Russian-Chinese relations demonstrate how trust in international relations can become a powerful driver of sustainable development. Economic, political and military cooperation based on mutual trust contributes to the implementation of major projects, ensuring regional security and developing new forms of cooperation. This example shows that trust between states can have long-term positive consequences for all participants, strengthening their positions in the international arena and promoting sustainable development.

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完善俄罗斯联邦劳动立法及采取其他措施防止侵犯劳工权利
**IMPROVEMENT OF THE LABOR LEGISLATION OF THE
RUSSIAN FEDERATION AND OTHER MEASURES TO PREVENT
ABUSE OF LABOR RIGHTS**

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摘要。本文致力于探讨俄罗斯联邦实际存在的侵犯劳工权利问题。作者分析了现行劳动立法，找出了导致此类侵权行为发生的漏洞和不足之处。本文提出了改进立法框架的具体建议，旨在防止雇主和雇员滥用法律。

关键词：劳动、法律滥用、远程工作、法律监管、俄罗斯联邦劳动法、雇员、雇主。

Abstract. *The article is devoted to the actual problem of abuse of labor rights in the Russian Federation. The authors analyze the existing labor legislation, identifying its gaps and shortcomings that contribute to the occurrence of such violations. The paper presents specific proposals for improving the legislative framework aimed at preventing abuse by both employers and employees.*

Keywords: *labor, abuse of law, remote work, legal regulation, Labor Code of the Russian Federation, employee, employer.*

The abuse of rights in labor relations today is of great interest not only in scientific doctrine, but also in everyday life. Probably, such an emphasis is placed precisely on the malicious behavior of subjects of labor relations due to its practice-oriented nature, because labor rights are realized by every person, regardless of his status. But despite the active discussion, many issues remain unresolved at the moment, which causes problems in law enforcement activities, since at the legislative level there is no fixed concept of this legal phenomenon, its characteristic features, as well as corresponding responsibility for the malicious behavior of subjects of labor relations, the use of unauthorized methods that contradict the purpose of the law. It is important to say that in the current labor legislation

to date there is no fixed definition of abuse of rights by subjects of labor relations, the legal consequences for abuse of rights are not indicated, its approximate forms are not disclosed. Therefore, we believe that in order to counter this rapidly progressing phenomenon, it is advisable to amend Art. 2 of the Labor Code of the Russian Federation, supplementing it with such a principle as “prohibition of abuse of rights”. It should also be noted that in the Labor Code of the Russian Federation[1] the principles of prohibition of forced labor and discrimination were given separate articles, therefore we believe that today there is an urgent need not only to consolidate the general legal principle, but also to devote a separate article to it in labor legislation, for example, in the introduction of Article 2.1 entitled “Prohibition of Abuse of Rights” by analogy with the above-mentioned principles. Such an article would fill in legislative gaps by introducing terminology, listing the main forms, and characteristic features. In this article, it would be possible not only to prescribe a sanction that would establish the possibility of the court, upon establishing the fact of abuse of rights, to refuse to satisfy the stated claims, but also to supplement others, for example, in the obligation of the subject of labor relations abusing the right to pay the other party compensation for moral damage, compensation for losses incurred as a result of unfair actions, etc. The legislator in Art. 21 of the Labor Code of the Russian Federation puts the conscientious performance of labor functions imposed by the employment contract in first place in the employee’s duties. We are convinced that the prohibition of abuse of rights should be reflected on the same level as conscientiousness. Thus, the employee will be obliged to “conscientiously perform his labor duties imposed on him by the employment contract, without abusing his right.”

In Art. 22 of the Labor Code of the Russian Federation, the employer’s duties do not include any mandatory consolidation of compliance with the principle of conscientiousness. By analogy with Art. 21 of the Labor Code of the Russian Federation, it should be prescribed that the employer is obliged to “act in good faith, not allowing abuse of rights, including for the purpose of deriving benefits and (or) causing harm to the other party to the labor relationship.”

In order to counteract the commission of acts of abuse of labor rights, various methods are distinguished that can be applied in practice by both the employee and the employer. The most obvious and important thing for an employee during the performance of their work functions is knowledge of their rights and obligations enshrined in labor legislation, and prevention of their violation. Practice clearly shows that an employee’s ignorance of labor legislation, at least at a basic level, is one of the catalysts for labor abuse by management. Many employees who have become victims of unfair actions by employers did not go to court, to supervisory and control authorities, because they believed that they would not be able to achieve anything, they would only waste time, and in general they do not see that

the employer is only creating the appearance of his legal actions. Employers must monitor compliance with labor legislation, develop and comply with internal rules, local acts and procedures, conduct an adequate assessment of disciplinary sanctions and take them only if there are sufficient grounds for this. Also, the employer can create a system of internal control and audit in order to prevent abuse of rights by the employee. Despite the fact that the Labor Code of the Russian Federation does not directly specify the employee's obligation to notify the employer about the opening of a sick leave, his duties include the conscientious fulfillment of his work duties. In turn, the employer has the right to adopt local regulations, as well as to require employees to comply with the rules of the VTR. If we do not supplement Art. 21 of the Labor Code of the Russian Federation with the obligation to notify the employer about the opening of a sick leave, then it seems possible to provide for such an obligation in the rules of the VTR. In this case, if the above obligation is violated, the employee may be brought to disciplinary responsibility in the established manner. Accordingly, such failure to notify may be regarded as an abuse of rights by the employee. We also believe that in order to avoid any claims from regulatory authorities, minimize risks, and legal proceedings, employers should include in the VTR rules or other local acts cases not regulated by the norms of the Labor Code of the Russian Federation that will indicate an abuse of rights by the employee. We believe that in order to establish and maintain a balance of rights and interests of subjects of labor relations, it is necessary to transform some rights of both the employee and the employer into an obligation. For example, we believe that the legislator did not quite correctly include in the obligation the employee's right to provide such information as membership in trade unions, the presence of a disability group, and a certificate of temporary incapacity for work. Since the employer is obliged to carry out certain procedures and provide guarantees, it is necessary for the employee to take appropriate actions to provide the necessary information. In other words, the legislator should replace the authority with an obligation, the optional method with an imperative one. We are convinced that replacing some optional norms with mandatory ones will be a good way to combat abuse of rights, since there will be no room for them at all.

Also, in our opinion, in order to combat abuse of rights, it is necessary to expand the list of documents required for employment, for example, providing certificates of health, despite the fact that this relates to a special category of personal data of a citizen, or to allow the employer to request in writing information about disability or notes on the absence of such status, so that in the future the employee's rights are not violated, all legal guarantees are provided and acts of abuse are suppressed.

It seems that changes should be made to the labor legislation of the Russian Federation regarding the possibility of terminating an employment contract at the

initiative of the employer with a pregnant woman, depending on the conscientious performance of her work duties (promptly inform the employer of her pregnancy, provide documents certifying a valid reason for her failure to perform her work duties, etc.). The proposed changes are based on the idea of the employer's ability to terminate an employment contract on his own initiative with a pregnant woman who, having committed a disciplinary offense sufficient to terminate the employment contract (for example, absenteeism), unfairly uses the provisions of the Labor Code of the Russian Federation, thereby causing harm or creating a real threat of causing harm to the employer. Or it is possible to reduce material losses in the following way: since a pregnant woman does not actually perform her work duties, hiding behind pregnancy and she cannot be fired, it is possible to record all absences, absenteeism, unfulfilled tasks, enter the actual number of hours worked in the timesheet, and pay only for the time actually worked. The attention of the legislator should also be drawn to the absence of a term of notice of incapacity established by law, the form of such notice to the employer itself, the term of notification of pregnancy.

In Art. 72.2 of the Labor Code of the Russian Federation, there is currently no prohibition on the repeated temporary transfer of an employee, there are no restrictions on the duration of the transfer, which gives rise to abuse on the part of the employer, therefore we consider it necessary to regulate this issue by law by supplementing Part 3 with the following wording: "Repeated temporary transfer of an employee without his consent is not allowed." As noted earlier, the legislator did not clearly indicate what exactly would be an unmotivated refusal. This gave rise to an evaluative category in labor relations, and evaluative categories are always a potential opportunity for committing acts of abuse of rights in any relationship. In order to prevent labor abuse on the part of the employer, Part 1 of Art. 64 of the Labor Code of the Russian Federation should be supplemented as follows: "An unjustified refusal of the employer to conclude an employment contract is recognized as such a refusal that does not contain specific reasons for the decision taken, or it is made on illegal grounds, including discriminatory ones, or is not related to the professional qualities of the employee." The evaluative category is also present in Art. 101 of the Labor Code of the Russian Federation when determining irregular working hours. The absence at the legislative level of a specific understanding for the law enforcement officer of what should be understood as the necessity and episodic nature of involving in irregular working hours, the grounds for involving in such work, its duration, thereby allowing these concepts to acquire an extremely evaluative understanding. In our opinion, this problem can be solved by introducing comprehensive explanations and regulations from the legislator into Art. 101 of the Labor Code of the Russian Federation, Part 3. Regarding the duration of irregular working hours, it seems possible to take as a

basis the answer of Rostrud “the duration of irregular working hours should not be transformed by the employer into an extended working day” [2].

The law currently does not prohibit signing a resignation letter with an open date, which allows the employer to abuse his rights: he can put pressure on the employee, threatening that he can fire him at any time without any notice. As soon as an employee ceases to be convenient for the employer, the latter will quickly say goodbye to him on the basis of the existing application. The legislator should establish a clear ban on the corresponding actions, which will help eradicate such fraud on the part of the employer and protect the rights and interests of the employee. Art. 80 of the Labor Code of the Russian Federation should be supplemented with the following imperative norm: “It is prohibited to sign a resignation letter without specifying the date. If the employee signs such a letter, it will be recognized as invalid.” Art. 70 of the Labor Code of the Russian Federation also needs to be supplemented. As noted earlier, there is a form of abuse of rights by the employer associated with the probationary period. It seems appropriate to introduce the following imperative norm: “Repeated conclusion of an employment contract with the same employee for the same position with the establishment of a probationary period is not allowed.” In our opinion, such wording will help prevent the violation of the employee’s labor rights and deprivation of his guarantees to limit the duration of the probationary period. This needs to be resolved in the near future either in a federal law or in other regulatory legal acts containing labor law standards, since the absence of established rights or obligations, restrictions inevitably leads to gaps in the regulation of a particular issue, on the basis of which there is an opportunity for abuse of rights. Russian labor legislation has great prospects and a fundamental basis for improvement. Regulating the boundaries of what is permissible for the parties to an employment contract will have a positive effect on establishing a balance between the employer and the employee in their rights, interests and obligations. The proposed methods for solving these problems can only guide and motivate, but the effectiveness and efficiency of their application will depend only on the desire and initiative of the parties to the labor relations.

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投保人向保险人通知保险事故发生的义务：法律规定与实践问题

**THE OBLIGATION OF THE POLICYHOLDER TO NOTIFY THE
INSURER OF THE OCCURRENCE OF AN INSURED EVENT:
LEGAL REGULATION AND PRACTICAL ASPECTS**

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注释。投保人有义务在保险事故发生时通知保险人，这是保险法律关系机制的重要组成部分，确保保险法律关系正常运转。这一义务在大多数国家的立法中都有规定，旨在保护保险合同双方的利益。在俄罗斯法律中，这一义务由《俄罗斯联邦民法典》第 961 条规定。其履行情况对保险赔偿支付的决定有重大影响。本文探讨了这一制度的理论和实践方面，并分析了司法实践和国际经验。

关键词：保险、保险人、保险事故、投保人。

Annotation. *The obligation of the policyholder to notify the insurer of the occurrence of an insured event is an important element of the mechanism of insurance legal relations, which ensures their proper functioning. This obligation is enshrined in the legislation of most countries and is aimed at protecting the interests of both parties to the insurance contract. In Russian law, this obligation is regulated by Article 961 of the Civil Code of the Russian Federation (CC RF). Its compliance has a significant impact on the decision on the payment of insurance compensation. This article examines the theoretical and practical aspects of this institution, as well as analyzes judicial practice and international experience.*

Keywords: *insurance, insurer, insured event, policyholder.*

Insurance obligations in the Russian legal doctrine are mutual. This fact implies that both sides have mutual rights and obligations. One of the obligations of the policyholder is the obligation to notify the insurer of the occurrence of an

insured event. According to Article 961 of the Civil Code of the Russian Federation, the policyholder is obliged to immediately notify the insurer of the occurrence of an insured event as soon as he becomes aware of it.[1] Moreover, it is clearly defined that the notification does not require the provision of documents for the insured event.[2] The law allows for the possibility of fixing more specific conditions in the contract: deadlines, notification format and the procedure for transmitting information. Each driver of a vehicle involved in an accident sends an electronic notification to the insurer who insured his civil liability using an automated mandatory insurance information system.

It is noteworthy that a number of platforms have been developed to implement the electronic document management format for registration of an accident: “Accident. Europrotocol”, “CTP Assistant” or “Public Auto Services”.

Despite the existence of these applications for several years, there are still some disadvantages in their use. For example, at the moment it is necessary to draw the scene of an accident on paper, and then photograph it and upload it to applications, applications are different in functionality and as a result, in a stressful situation, it is very difficult to download and choose the right one. In addition, it should be taken into account the fact that Internet coverage in the city in some areas raises a number of questions, and as for accidents on roads, highways, the fact of the existence of white zones uncovered by the Internet is known to everyone, and drivers need to understand that applications are not always available due to technical work and wait for the restoration of work It can take quite a long time.

If the policyholder does not comply with this requirement, the insurer may refuse to pay the insurance indemnity, except in cases where:

1. The Insurer learned about the occurrence of the insured event in another way;
2. The absence of notification did not affect his obligation to make a payment.

It is important to note that notification obligations can be imposed not only on the policyholder, but also on the beneficiary if he claims to receive insurance compensation. [3]

Failure by the policyholder to comply with the notification obligation leads to legal consequences that are directly related to the issue of payment of insurance compensation. However, the policyholder can avoid adverse consequences if he proves that:

1. The Insurer found out about the insured event in a different way within the established time frame.
2. The delay in notification did not affect the extent of his responsibility. [4]

Thus, the legislation leaves room for a flexible approach to assessing the behavior of the parties in each specific case. This reduces the risk of abuse by insurers and contributes to the fair settlement of insurance disputes.

Judicial practice demonstrates the great importance of evidence of timely notification of the insurer. Examples from court decisions show that in disputes, the policyholder must provide evidence of fulfillment of his obligations, for example, provide receipts for sending a notification or copies of correspondence with the insurer.

One of the key issues is determining the moment when the policyholder should have learned about the insured event. When considering such disputes, the judicial authorities take into account not only the factual circumstances, but also the nature of the relationship between the parties, the content of the contract and the reasonableness of the policyholder's actions.

If we turn to the experience of foreign countries where insurance is developed at a higher level, then the following point can be noted.

In international practice, there is also an obligation for the policyholder to notify the insurer of the occurrence of an insured event. For example, the legislation of EU countries such as Germany and France provides for similar rules, but the requirements for the timing and forms of notification may vary significantly.

In the UK, the principle of good faith (utmost good faith) applies, which obliges the policyholder to notify the insurer of all circumstances related to the insured event within a reasonable time. [5] Failure to fulfill this obligation may result in refusal to pay or cancellation of the insurance contract.

To avoid disputes and negative consequences, it is recommended to follow the following rules:

1. Carefully study the terms of the insurance contract, especially those relating to the procedure and timing of notification.
2. Use official and documented communication channels to notify the insurer (e-mail, registered letters with delivery notification).
3. Keep copies of all sent documents confirming the fact of notification.
4. If in doubt about the content of the notification, consult a lawyer.

Thus, the obligation of the policyholder to notify the insurer of the occurrence of an insured event is a fundamental element of insurance legal relations, which ensures their stability and predictability. Proper performance of this duty not only protects the rights of the parties, but also contributes to the formation of trusting relations between them. Russian legislation regulating this issue is in harmony with international approaches, but the development of law enforcement practice remains an important task to improve the effectiveness of the insurance system as a whole.

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以问题为导向的力学学习是培养学生分析思维能力的手段

**PROBLEM-ORIENTED LEARNING IN THE STUDY OF
MECHANICS AS A MEANS OF FORMING ANALYTICAL TYPE OF
THINKING IN STUDENTS**

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注释。当今社会对现代学校提供的教育质量提出了非常严格的要求。现代学校的主要任务是发掘每个学生的能力，培养出在高科技、竞争激烈的世界中为生活做好准备的个性。所有这些都需要对数学、力学、物理学等基础学科有透彻的了解。在这方面，本文证实了以问题为导向的教学方法在数学和物理研究中作为培养学生分析思维方式的手段的相关性。

关键词：数学、运动数学模型、圆长、力学、动机、分析思维方式、跨学科路线。

Annotation. Today's society makes quite serious demands on the quality of education provided by a modern school. The main task of a modern school is to reveal the abilities of each student, to educate a personality ready for life in a high-tech, competitive world. All this requires a thorough knowledge of fundamental academic disciplines such as mathematics, mechanics, physics and others. In this connection, the article substantiates the relevance of methods of problem-oriented teaching of students in the study of mathematics and physics as a means of forming analytical type of thinking in students.

Keywords: mathematics, mathematical model of motion, circle length, mechanics, motivation, analytical type of thinking, interdisciplinary lines.

Philosophy is written in that majestic book which is constantly lying open before our eyes (I mean the universe), but which cannot be understood without first learning its language and recognizing the scripts with which it is written. Its language is the language of mathematics.

Galileo

The labor market focused on the development of the industrial sector of economy determines the demand for engineering professions. When speaking about students readiness to choose engineering professions, we understand the availability of quality knowledge of students in specialized subjects, project skills in engineering, stability of interests, and ability for creative activity. In this connection, the problem-oriented approach in teaching becomes in demand. This approach is an effective pedagogical technology, focused on the active inclusion of students in the learning process through the solution of real problems, develops the ability to think logically, analyze and draw conclusions. This is especially relevant in the context of learning to build mathematical models of real phenomena, where the main tasks are the ability to apply mathematical knowledge in practice to solve practical problems.

The Big Encyclopedic Dictionary defines the word “thinking” as “the highest stage of human cognition, which allows to obtain knowledge about such objects, properties and relations of the real world, which cannot be directly perceived at the sensual stage of cognition” [1].

In science, the psychological term “analytical type of thinking” is closely connected with the main categories of pedagogy: upbringing, education, training. This connection is facilitated by the basic principles of modern education, which include the concepts of information, analysis, and analytical approach. Examples of what analytical thinking influences and how to develop it are shown in Fig. 1.

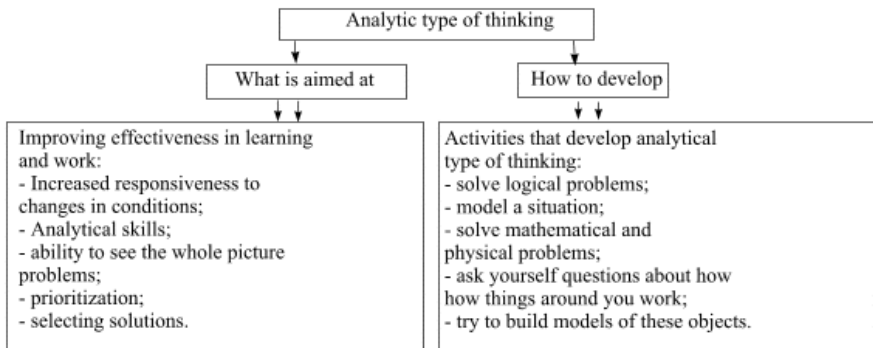


Figure 1. Impact of analytical thinking on learning effectiveness and development

We will understand the analytical type of thinking as a student’s ability to collect and process a large block of information, divide it into its component parts and compare them, draw conclusions and make decisions based on them. The principle of analytical type of thinking is based on two basic processes:

- formal process, accompanied by the analysis and synthesis of data, as well as conclusions and fixing the final result in the mind;
- creative process accompanied by the search for new knowledge and information.

At analytical type of thinking the main thought operations are: abstraction and concretization, analysis; generalization, synthesis, comparison and analogy, classification and systematization.

The above-mentioned thinking operations play a crucial role in problem-based learning for students to address the technical needs of humankind. An important task of such learning is to focus students on solving real-world problems. Thus, in mechanics, problem-oriented approach is possible, for example, when students solve practical problems, in the process of which the above-mentioned thinking operations come into action, and also leads to comprehension of the essence of the studied objects and processes on the basis of identifying the fundamental connections, regularities, principles, which are not specified by algorithms and formulas.

Formally, the learning process is built on the material laws of physics and mathematics, since all material things have common properties, similar features and structure, and the creative process goes beyond the specific knowledge and experience of a particular person [2].

The content orientation of the process of forming analytical thinking of students will consist of teaching the logic of analytical reasoning on the basis of mastering the essence of the studied mathematical and mechanical concepts, complex use of thought operations when solving non-typical tasks. This ensures the interrelation of inductive and deductive ways of performing the formulated tasks; encouraging students to model and choose different ways of solution. At the same time, there is training in the rational use of mathematical symbolism; activation of students' actions to create and use applied aspects of mathematical knowledge; practical assistance to the learner in his/her independent structuring of educational material, taking into account the peculiarities of analytical thinking development [3].

The presence of analytical type of thinking of technical orientation in students presupposes the presence of personal qualities such as curiosity and ingenuity. These qualities can be strengthened by using in parallel in the lessons of mathematics, physics and technology methods of problem-oriented learning, consisting of practical tasks that provide quality results of mastering the necessary information. The content of I. Newton's classical mechanics has unlimited possibilities for selecting appropriate tasks. In the process of teaching mathematics and establishing logical connections, for example, with the principles of the simplest mechanisms and possible applications in practice, the analytical type of thinking in students is strengthened.

The key concept in problem-based learning is the concept of “problem”. A learning problem is understood as a task that cannot be solved according to a model, but requires an “original” approach. Such problems can be design problems, rationalization problems, and problems that require searching for a physical way to solve a given practical problem. The inherent problem-solving ability of mechanics makes it an ideal object for the realization of problem-oriented learning.

For effective integration of the problem-oriented approach the teacher can apply several variants of its realization. At the same time, use the acquired knowledge and skills in mathematics lessons in practical activities and everyday life. As a means of forming the analytical type of thinking of students, let us consider the possibility of using the mathematical apparatus to build a theory of circular motion of an object (point) in a physics lesson [4, 5].

The formulation of the problem on circular motion can be formulated as follows: “At the physical education lesson, the teacher suggested that girls run on the inner circle of the radius, boys - on the outer circle. In this case, the size of the outer circle is twice the size of the inner circle. In Fig. 2, boys are represented by the point M_1 , girls by the point M_2 . How many laps should the boys run and how many laps should the girls run so that the boys run a distance one and a half times longer than the girls for the same time.

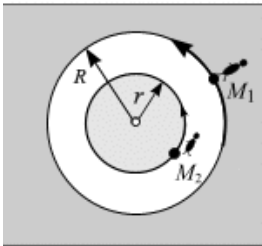


Figure 2. *Circular movement of students*

Thinking about the essence of the task can cause students to react to the unfairness of the exercise proposed by the physical education teacher, which activates the thinking process. At the same time, during physical education classes at school, girls and boys already notice the difference in running speed. With purposeful actions on the part of the teacher, it becomes clear to them that for girls and boys the physical load

should be different. Therefore, despite a certain competitiveness on the one hand, and the desire to equalize the loads on the other hand, students may well agree with the legitimacy of the task proposed by the teacher. And thus the task itself will acquire a real meaning for them and arouse their curiosity. And, really, how fast should boys run in relation to girls in order to fulfill the teacher’s task? This creates a prerequisite for introducing the concept of “circular speed” on the basis of the analytical type of thinking.

Let us define circular velocity as the velocity possessed by a point in uniform circular motion. In this case, the point moves along the circle with a modulo constant velocity, while the direction of velocity changes at each location due to a change in the direction of the velocity vector.

Modeling the real situation leads to the fact that the movement of boys and girls can be taken as the movement of points. It is important to refer to one's own experience and realize that in order to cover the same distance S , the number of revolutions when moving on a circle of smaller radius r must be greater than on a circle of larger radius R . The solution to this problem requires thinking about the connection between geometry, which defines the lengths of the arcs of circles, and the concept of the speed of a point. Solving this problem requires understanding the relationship between geometry, which defines the lengths of the arcs of circles, and the concept of the velocity of a point.

Then it is possible to proceed to the consideration of the scheme of possible additional definition of the conditions of the set problem and carrying out calculations on the interdisciplinary content, which will lead to its solution.

First of all, to build a mathematical model of the motion of a point on a circle, it is necessary to introduce conventional notations. Let R be the radius of the outer circle and r be the radius of the inner circle. Then their ratio can be represented by the mathematical expression: $R=2r$. To calculate the circular velocity, let us define it as the number of revolutions of the point on the circle per unit time.

The following knowledge from Euclidean geometry is required to solve the problem at hand:

I. The length of the circle is calculated by the formula $S = 2\pi R$, here $\pi \approx 3,14$ is a constant value, R is the radius of the circle.

In order for students to understand that number $\pi \approx 3,14$ is a constant value and does not depend on the radius of the circle, an experiment is conducted with students. For the experiment, they choose several circles of different diameters D_i . For example, if 10 different circles are chosen, then $i = 1, 2, \dots, 10$. Mark any point "A" on each circle and measure with a scale L_i ruler to the nearest millimeter the distance, which corresponds to the path S_i traveled by the point "A" during a complete revolution of the circle on a stationary smooth surface (IT), Fig. 3.

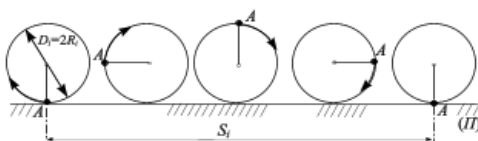


Figure 3. Natural experiment for measuring the length of a circle

This measures the length of the circle. The length of the circle can also be measured with a non-stretchable thread. It is important to measure the diameter of each circle with the same scale bar D_i .

Then they calculate the fraction, the numerator of which is equal to the length of the circle, the denominator - to the diameter: $\frac{S_i}{D_i}$ and calculate the average value of the obtained digits. As a result of the experiment, students are convinced that

the ratio of the length of a circle to its diameter at any diameter of the circle is a value equal to $\approx 3,14$. This value is denoted by the Greek letter “ π ”. Students are convinced that the length of a circle is equal to $2\pi R$.

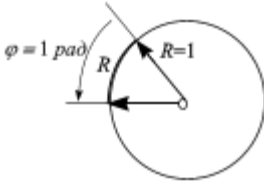


Figure 4. Definition of the radian

II. All angles are expressed in numbers – degrees or radians.

The radian is the value of the central angle that rests on an arc of a circle of length equal to the radius of the circle and is denoted by 1 rad , with $1 \text{ rad} \approx 57,3^\circ$, fig. 4.

$$S = R \cdot \varphi \Rightarrow \varphi = \frac{S}{R}$$

To calculate the part of a circle, the arc length, we use the radian measure. The central angle resting on the arc S in radians is defined by the ratio:

$$S = R \cdot \varphi \Rightarrow \varphi = \frac{S}{R} \tag{1}$$

The velocity of motion of a point at a given time interval is given by the ratio of the displacement of the path ΔS to the time Δt interval for which the point has traveled this path. Thus, it becomes possible to introduce a mathematical model for the definition of circular motion and circular velocity. We have: $V_{cp} = \frac{\Delta S}{\Delta t}$. For circular motion we define $\Delta S = R \cdot \Delta \varphi$.

$$\text{Then } V_{cp} = \frac{\Delta S}{\Delta t} = R \frac{\Delta \varphi}{\Delta t} = R \cdot \omega_{cp}$$

This is where the designation is introduced:

$$\omega_{cp} = \text{average angular velocity} = \frac{\text{angle of rotation}}{\text{time lapse}} = \frac{\Delta \varphi}{\Delta t} \tag{2}$$

In this expression, the average circular velocity is measured in radians per second ($\frac{\text{radian}}{\text{second}} \equiv \text{c}^{-1}$). In engineering, circular velocity is measured in revolutions per minute. Converting the units of measurement we obtain:

$$\omega_{cp} (\text{c}^{-1}) = \frac{2\pi}{60} \cdot n \left(\frac{\text{rotations}}{\text{minute}} \right) \tag{3}$$

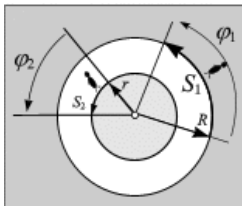


Figure 5. The path that boys and girls

The knowledge presented above we need to determine the kinematic characteristics of motion

boys and girls Comprehension of the above knowledge allows us to find a way to solve the problem. By linking the length of the arc of the circle with the circular velocity, it is possible to determine the number of circles to be run by boys and girls. So, let S_1 - the path run by boys, S_2 - by girls (Fig. 5).

From the conditions of the problem: $S_1 = 1,5 \cdot S_2$. Then, having in mind (1), we obtain:

$$\varphi_1 \cdot R = 1,5 \cdot \varphi_2 \cdot r.$$

The obtained expression allows us to pass to the following relation of the central angles depending on the radii of the circles:

$$\varphi_2 = \varphi_1 \frac{R}{1,5 \cdot r} \Rightarrow \varphi_2 = \varphi_1 \frac{2 \cdot r}{1,5 \cdot r} \Rightarrow \varphi_2 = \frac{4}{3} \cdot \varphi_1$$

According to (2) we have that:

$$\varphi_2 = \frac{4}{3} \cdot \varphi_1 \Rightarrow \frac{\varphi_2}{t} = \frac{4}{3} \cdot \frac{\varphi_1}{t} \Rightarrow \omega_2 = \frac{4}{3} \cdot \omega_1$$

Using the conversion formula (3) we obtain:

$$\omega_2 = \frac{4}{3} \cdot \omega_1 \Rightarrow \frac{2\pi}{60} \cdot n_2 = \frac{4}{3} \cdot \frac{2\pi}{60} \cdot n_1 \Rightarrow n_2 = \frac{4}{3} \cdot n_1 \Rightarrow n_2 = 1\frac{1}{3} \cdot n_1.$$

Thus, understanding what can be $\frac{4}{3} = 1\frac{1}{3}$ inferred by answering the question of the problem: girls, running on the inner circle, must run one-third more laps than boys.

In the next step, it is possible to ask the students to reformat the problem formulation using integer data values that allow the PE teacher to give the students the task of running around circles. And, later, the students can check the validity of the data selection in practice, directly in the gym, by recording the running time with a stopwatch. In this way the students will have the experience to calculate the time, distance, speed of movement on a circle.

It seems possible to see the productivity of the application of the scheme of the process of formation of skills to apply mathematical knowledge in building models of real phenomena - to form an analytical way of thinking [6, 7]. The main difficulty, as it becomes clear in the process of work, is to find real and understandable objects and processes for cognition in the form of mathematical models and methodical setting of cognitive tasks. In this case, it becomes necessary to cooperate with didacticians and methodologists, who are the bearers of interdisciplinary mathematical and natural science knowledge. It is such a union that can provide a different approach to the mathematical training of students, which is a fundamental basis for cognition of the natural and social environment, objects of the technosphere and others.

Thus, the technology of problem-oriented learning contributes to the emergence of cognitive interest in students by searching for solutions, proposing and verifying the correctness of solutions to the task. In other words, it allows us to move to a qualitatively new level of studying mathematical and natural science academic disciplines.

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国外学术实习是培养学生沟通能力的有效手段
**FOREIGN ACADEMIC INTERNSHIP AS AN EFFECTIVE MEANS
OF DEVELOPING STUDENTS' COMMUNICATIVE SKILLS**

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摘要。本文探讨了国外实习对外语实际运用和知识的积极影响。分析了实习的类型及其相对于传统语言学学习方法的优点。根据现有研究和个人经验，确定了可以判断在国外实习条件下交流技能发展有效性的标准。提出了证明这种教育方法有效性的论据。考虑了出国实习的学生可能面临的困难。

关键词：教育领域、国际项目、国际科学实践会议、外国教育和科学培训、学生交流、高中合作伙伴。

Abstract. *The article examines the positive impact of foreign internships on the practical use and knowledge of a foreign language. The types of internships and their advantages over the classical methodology of studying linguistics are analyzed. Based on existing research and personal experience, criteria have been identified that allow us to judge the effectiveness of the development of communication skills in the conditions of a foreign internship. The arguments proving the effectiveness of this method of education are presented. The difficulties that students who go on an internship abroad may face are considered.*

Keywords: *educational sphere, the international programs, the international scientifically practical conferences, foreign educational and scientific training, an exchange of students, high schools-partners.*

One of the central vectors of the development of the Russian education system in the context of globalization is its integration into the global educational space. The expansion of the global educational sphere has a special impact on the intensity of international communications of Russian educational institutions. It contributes to the accelerated development of partnerships, mutually beneficial cooperation between universities in different countries and the export of Russian educational services to neighboring countries.

The peculiarity of the national education and science systems of the XXI century is the increased academic and scientific mobility. Every year several million

people travel to various countries of the world for scientific and industrial internships, conferences, seminars and studies.

Materials and methods

Provisions on cooperation in the field of education and scientific exchanges are included in international treaties of the Russian Federation with dozens of countries around the world. In accordance with the current legislation of the Russian Federation, higher educational institutions of Russia were granted the right to carry out international activities (student exchange, educational and scientific-pedagogical internships, etc.) independently – both within the framework of international treaties, programs and projects, and on the basis of bilateral agreements with foreign universities, scientific institutions [1, p. 93].

In this paper I would like to consider the effectiveness of internships abroad as a way of learning a foreign language and assess the impact on the development of students' communication skills. I would like to analyze the practical significance of this experience and the difficulties that may arise in its process.

Results and its discussion

An internship is training on specially created or dedicated working conditions. The main purpose of the internship is the formation and consolidation of professional knowledge, skills and abilities according to the acquired qualifications (profession, specialty). The internship is also indispensable for studying best practices, acquiring professional and organizational skills for specialists planning to take a higher position.

Internship is an independent type of additional professional education. Researchers distinguish 3 types of internships: research; scientific and methodological; linguistic. Research internships provide an opportunity to listen to several theoretical disciplines, write an article, etc. Scientific and methodological internships are aimed at improving the methodological techniques of students and involve the preparation of educational and thematic plans, the development of author's programs, and the creation of educational and methodological publications. Language internships are aimed at improving the level of foreign language proficiency.

Internships abroad are currently gaining great popularity, which help to put the acquired knowledge into practice in a new language environment, while expanding your own horizons while traveling. Going to another country, a student not only improves his level of proficiency in a foreign language, but also gets valuable experience that he can use in scientific and research activities in the future. An internship abroad allows you to gain skills that can be acquired only after leaving your comfort zone and native culture.

Foreign internships also have global advantages that prove their importance. The development of cooperation between universities of different countries and the exchange of students develops cultural and economic ties between states, con-

tributes to general scientific and technological progress. In many industrialized countries of Europe, Asia, and America, short-term internships of undergraduates, university graduates, young scientists and specialists abroad have become the norm, which further facilitates their employment at home. Such internships are considered as a useful exchange of scientific ideas, research and technological experience.

The educational environment during the internship period makes it possible to ensure the effectiveness of the functioning of the education model in four main directions – meaningful, cross-cultural, personal, professional [4, pp. 119-120].

Cross-cultural, intercultural competence is supported by official events (classes, lectures, excursions, forums) and informal contacts (meetings with students, daily communication) with representatives of another culture and civilization, providing functional skills to understand the views and opinions of representatives of another culture, correct their behavior, recognize the right to exist different values, norms of behavior, readiness to other standards of world achievements, ultimately – to overcome conflicts in the dialogue of cultures.

In modern society, specialists with knowledge of two or more languages are in demand, and English is considered a prestigious and often necessary skill. Knowledge of a foreign language currently acquires primarily a social meaning, determined by the order of the state, the tasks that it will leave for education, based on the level of production, science, culture, as well as the needs of modern society. In addition, the possibility of obtaining and continuing education abroad is not feasible without proficiency in a foreign language both as a means of communication and as a means of obtaining new professional knowledge.

Coming to any country for an internship, a student often gets the opportunity to practice language and study several languages at once. First of all, this is the language of the country in which the internship is carried out and which will be studied in the curriculum. But, in addition, universities usually form a large international community of students from different countries. Communicating with them allows you to get more practice in English, which is an international language, as well as begin to get acquainted with new languages.

So, in China, most of the visiting exchange students come from Thailand, Vietnam, Russia, Mongolia. During my internship at Harbin Normal University, I also managed to meet students from Spain, Mexico, Kazakhstan and Sudan. Such an experience motivates you to continue learning different languages, build new acquaintances with representatives of other countries and learn more about their culture. This is a great opportunity for students to improve their skills in a non-standard situation and expand the horizons of their knowledge.

An important result of the internship is the improvement of communicative literacy, speech communication, improvement of communicative culture, and the

development of sociability. Even a short-term internship helps students to test their foreign language competencies, feel the foreign language environment, and establish first contacts with foreign students, which sometimes turn out to be the strongest and long-term.

Let's take a closer look at how communication skills can be developed during an internship abroad and what difficulties students may face in a new language environment.

Visiting any country involves studying its history, culture and art. Language as a means of communication is directly related to the mentality and cultural traditions of the people who speak it. Familiarity with the cultural code can help students to look at the rules established in the language from a new angle, to understand the logic of grammatical constructions and logical sentence construction.

Back in the 19th century, the great German scientist Wilhelm von Humboldt suggested that language is not a means of communication, as everyone thinks, but a way of thinking that determines behavior. In the 20th century, Humboldt's ideas turned into the Sapir – Whorf hypothesis of linguistic relativity, and quantitative studies began on which features of language influence certain characteristics of behavior and culture [7].

For example, individualism in society is directly correlated with the obligation to use a personal pronoun. If it is impossible to remove a personal pronoun from a phrase in a language, then society, as a rule, has a high level of individualism, significant attention to human rights. If, as in Russian, Greek or Portuguese, the pronoun can be omitted, then there is no clear predisposition to individualism.

Very subtle and complex studies are related to the concept of discourse in language about how speech is generally arranged. There are high-context languages and cultures where much is not said, but it is assumed, and low-context ones where there is nothing to add to what has been said. This is, for example, the English language — hence the behavior based on a clearly defined system of rules.

The structure of the written language also affects the characteristics of culture and worldview. For example, it happens that there are rules, but there are many exceptions to each rule. In Russian it is exactly like that. This is not only a property of language, but also a translation of the attitude towards the institutions of law: «the rules are not absolute».

Thus, being in a foreign language environment helps to learn a new language and introduces you to the culture of another country. This makes it possible to develop linguistic and socio-cultural communicative competencies.

Communication with foreign colleagues, teachers, and students contributes to the development of methodological, theoretical, and practical skills, the exchange of experience and ideas, and the expansion of knowledge about innovative technologies and methods. By interacting with people from other countries who share

common interests, activities, and goals with you, you improve your professional knowledge. It is always a new experience and an opportunity to improve professionally useful competencies.

A student who has completed such an internship option will expand his horizons and, in the future, will be able to successfully realize himself in his profession. In addition to the already familiar English, he can learn other languages by communicating with their native speakers directly. This is a chance to make interesting new acquaintances and friends from all over the world.

In addition, daily interaction with ordinary residents of the country helps to learn new vocabulary, consolidate already learned phrases and bring their use to automatism. Active communication teaches a person quick thinking, effectively affects knowledge and skills to build a dialogue. A person who finds himself in a new language environment develops the ability to actively use his vocabulary.

The analysis of pedagogical practices and behaviors, familiarity with different cultures influence the development of critical thinking and personal qualities, broaden horizons. This is especially important for those students who have chosen the teaching profession as their field of activity. The experience of a teacher who has actually visited the country of the language being studied increases students' interest in the learning process and motivates students.

What difficulties can become an obstacle for a student who has gone on an internship in another country? First of all, the issue concerns adaptation. Being in a foreign language environment, the student is forced to quickly adapt to the living conditions, climate and nature of the region. However, it is worth noting that difficulties rather contribute to the development of professional skills, bring knowledge to automatism, develop quickness of reaction, teach not to give up and quickly adjust to changing conditions.

The language barrier is becoming a big problem. Often, when communicating with foreigners, problems may arise related to misunderstanding each other. A person in such situations may lose confidence and fall into a stupor, and subsequently avoid contact with foreigners, try to minimize communication in an unfamiliar language. This is the main mistake! The main thing that an internship abroad can give is the experience of communication.

It is important to remember that the formation of professionalism is impossible without direct knowledge and experience of the dialogue of cultures. The unique experience of an international environment, a different cultural environment and educational technologies, new personal and educational contacts are just a few things that students expect. It is important to be open to a new environment, ready to speak a foreign language and overcome the fear of making mistakes!

Conclusion. Foreign internships are one of the most effective means of developing communication skills. They allow students to improve their knowledge of

the language, learn how to apply their knowledge in practice in a live dialogue. Internships abroad are an excellent motivation for students, as they open up new educational opportunities and valuable experience.

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攻读教育学硕士学位, 学习人工智能基础知识
**STUDYING THE BASICS OF ARTIFICIAL INTELLIGENCE IN
THE PEDAGOGICAL MASTER'S DEGREE**

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摘要。本文探讨了在硕士和继续教育教育计划中研究人工智能技术和算法的问题。在社会领域引入人工智能技术将有助于创造改善人口生活水平的条件。在教育领域, 这应该伴随着服务质量的提高, 使教育过程适应学生的需求和劳动力市场的需求。

关键词: 人工智能、人工智能技术、机器人技术、聊天机器人。

Abstract. *The article examines the issues of studying artificial intelligence technologies and algorithms in educational programs for master's and additional education. The introduction of artificial intelligence technologies in the social sphere will help create conditions for improving the standard of living of the population. In the education sector, this should be accompanied by an increase in the quality of services by adapting the educational process to the needs of students and the needs of the labor market.*

Keywords: *artificial intelligence, artificial intelligence technologies, robotics, chatbot.*

Currently, artificial intelligence is given special attention in many sectors of industry, economy, social sphere and education. In 2019, the “National Strategy for the Development of Artificial Intelligence for the Period up to 2030” was approved (Decree of the President of the Russian Federation of October 10, 2019 No. 490 “On the Development of Artificial Intelligence in the Russian Federation”). The goal of the strategy is to ensure the accelerated development of artificial intelligence in the Russian Federation, conduct scientific research in the field of artificial intelligence, increase the availability of information and computing resources for users, and improve the system of training personnel in this field. The strategy

for the development of artificial intelligence is integrated with other development programs, in particular the National Program “Digital Economy of the Russian Federation” [1].

Despite the widespread use of artificial intelligence, there is no unambiguous definition of this concept. In the strategy, artificial intelligence is understood as a set of technological solutions that allow simulating human cognitive functions (including self-learning and finding solutions without a predetermined algorithm) and obtaining results when performing specific tasks that are at least comparable to the results of human intellectual activity. Artificial intelligence technologies are technologies based on the use of artificial intelligence, including computer vision, natural language processing, speech recognition and synthesis, intelligent decision support and advanced artificial intelligence methods.

The introduction of artificial intelligence technologies in the social sphere will help to create conditions for improving the standard of living of the population. In the education sector, this should be accompanied by an increase in the quality of services by adapting the educational process to the needs of students and the needs of the labor market, systematic analysis of training performance indicators to optimize career guidance and early identification of children with outstanding abilities, automation of knowledge quality assessment and analysis of information on learning outcomes, etc. [2, 3].

One of the main areas of development of the artificial intelligence market is to provide this market with qualified personnel and to increase the level of public awareness of the possible areas of use of such technologies. This requires the development and implementation of educational modules within the framework of educational programs at all levels of education, advanced training programs and professional retraining. The task is also set to increase the number and improve the attractiveness of competitions and olympiads aimed at developing the intellectual and creative abilities of students.

At the Department of Technological and Professional Education of Saratov State University named after Pitirim Sorokin, educational modules of artificial intelligence were introduced into educational programs at different periods.

In 2016-2019, the fundamentals of artificial intelligence technologies were considered in additional education in educational robotics. Students and schoolchildren studied together at the “School of Competitive Robotics” and participated in various Olympiads and competitions in which it was necessary to demonstrate competencies in the field of technical vision [4]. Such Olympiads and competitions included “Robottraffic with Technical Vision” (Tomsk), “Automotive Intelligent Robotic Systems, Intelligent Unmanned Vehicles” (Innopolis), “AutoNet of the All-Russian Robotics Festival ROBOFEST” (Moscow), etc.

Participants in the competition must have basic robotics competencies - programming the Arduino controller; programming the Raspberry Pi microcomputer

in C++ or Python; interfacing controllers and microcomputers with sensors and actuators, such as an encoder, electric motor, servo drive; exchanging data between the Arduino controller and the Raspberry Pi microcomputer using standard interfaces (UART, I2C), as well as competencies in the field of machine vision based on the OpenCV library - receiving an image from a camera; correcting the size, resolution, brightness, contrast, color; highlighting individual sections of an image; highlighting contours; finding the desired contours; calculating the size, brightness and color components of individual sections of an image; recognizing road markings, traffic lights and their signals, road signs based on the analysis of characteristic features of images.

In 2018-2021, the fundamentals of artificial intelligence were included in the main educational programs of the Master's degree in pedagogical education with the profiles "E-learning" and "Digital environment of an educational organization". The fundamentals of artificial intelligence technologies in education are considered in the discipline "Robopedagogy" using the example of designing educational chatbots. Chatbots combine many technologies and ideas of artificial intelligence: data analytics, speech recognition technologies, algorithms and recommendation mechanisms, the ability to integrate with various social networks and messengers and allow you to perform many roles (content curation, consulting, assessment, etc.) [5].

There are several dozen platforms known for creating chatbots, such as IBM Watson, Microsoft Bot Framework, LUIS, Wit.ai, Api.ai, Chatfuel and others. All of them provide a fairly wide range of tools for designing various chatbots, filling them with content and functionality. In the educational process, the most accessible platform is SnatchBot - an online constructor for creating complex chatbots with support for various promotion channels. The main advantage of this platform is that it supports the entire life cycle of the bot: from creation and testing to hosting and publication. Any of the created bots can be either completely autonomous or with support for chat with a person.

Since 2022, Saratov State University named after Pitirim Sorokin has been implementing the master's program "Artificial Intelligence. Digital Environment of an Educational Organization". Among the competencies that are planned to be developed in students, the following should be highlighted:

PC-1. Capable of designing and implementing the educational process in the field of artificial intelligence in educational organizations of basic general, secondary general, and vocational education.

PC-2. Capable of designing the content of academic disciplines (modules) on artificial intelligence, forms and methods of control, control and measuring materials.

PC-3. Capable of participating in solving professional project tasks, choosing and implementing a team role in working on a project in accordance with the priorities of his/her own activities.

PC-4. Able to explore the use of intelligent systems in the digital environment of an educational organization.

The academic disciplines in which these competencies are formed include: “Methods of Artificial Intelligence”, “Machine Learning and Big Data”, “Computer Vision”, “Neural Networks”, “Intelligent Digital Environment of an Educational Organization”, “Methodology of Teaching the Subject Line Artificial Intelligence”, etc.

The development of artificial intelligence will be facilitated by the development and implementation of educational modules within the framework of educational programs at all levels of education to enable citizens to obtain knowledge, competencies and skills in the field of mathematics, programming, data analysis, machine learning. At the same time, in order to develop promising methods of artificial intelligence, convergent knowledge is of priority importance, including through the integration of mathematical, natural science and social and humanitarian education.

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师范大学图像方法研究的特点
**FEATURES OF STUDYING IMAGE METHODS IN A
PEDAGOGICAL UNIVERSITY**

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摘要。本文的内容是师范大学学习描述几何基础的方法论特征。所选主题是培养未来数学教师最重要的主题之一。事实上，空间图形的视觉图像对于在立体测量学课程框架内研究其属性是必不可少的。根据此处提供的信息，使用数字教育资源将有助于优化在讲座中学习图像理论基础的速度，并提高在实践课中完成作业的质量。在演示过程中，给出了在平行投影中构建体积图形图像的必要论证示例。本文是作者在师范大学教授高等几何多年经验的总结。

关键词：高等几何、平行投影、图像、学习、教学、地理数学程序。

Abstract. *The methodological features of studying the basics of descriptive geometry in a pedagogical university constitute the content of this article. The chosen topic is one of the most important in the preparation of a future mathematics teacher. Indeed, visual images of spatial figures are necessary for studying their properties within the framework of the school course in stereometry. According to the information presented here, the use of digital educational resources will help optimize the pace of studying the basics of image theory in lectures and improve the quality of completing assignments in practical classes. In the process of presentation, examples of the necessary argumentation for constructing an image of a volumetric figure in parallel projection are given. This article is a generalization of the author's many years of experience in teaching higher geometry at a pedagogical university.*

Keywords: *higher geometry, parallel projection, image, learning, teaching, geogebra program.*

The introductory part of the course in descriptive geometry, as a rule, includes updating the students' basic knowledge of how to depict three-dimensional figures on the plane of the drawing using their parallel projection. For the introductory conversation, the students should be shown several stereometric school drawings

(polyhedrons or round bodies) and then asked questions that have approximately the following wording:

- 1) What should be the point to which we should drop the height of the pyramid from its apex? Is there any rule on this matter?
- 2) Is it true that for a certain apex of an arbitrarily constructed pyramid, all three of its plane angles are right angles?
- 3) Is it permissible to draw a sphere using the shape of an ellipsoid?
- 4) Can an inclined plane intersect the lateral surface of a triangular pyramid along an arbitrary triangle ABC , if a straight line is given along which the planes of the section and the base of the pyramid intersect?

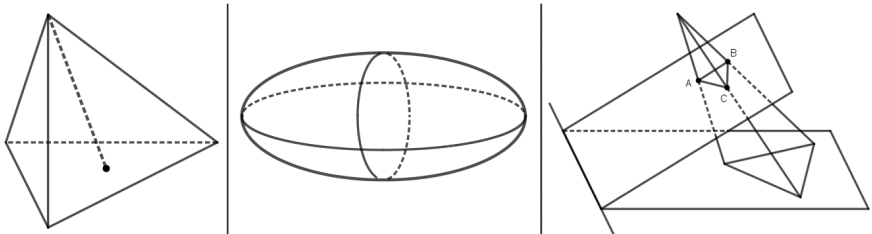


Figure 1. Examples of images.

During the discussion of these issues, students receive information that there are certain rules and patterns that must be followed when creating spatial images on the plane of a school board or a sheet of a student's notebook.

- 1) The image must be similar to a parallel projection of the original.
- 2) The image must create a true idea of the real form of the original.
- 3) The image must be made using standard drawing tools.

Next, typical errors that are often made when constructing spatial drawings should be pointed out. At this point, students have the opportunity to complete an interactive task of sorting correct and incorrect images presented on the finished drawings. For example, using the Learningapps computer application, you can create corresponding tasks that will be available to students on any device (smartphone or tablet), thanks to a QR code. (Fig. 2).

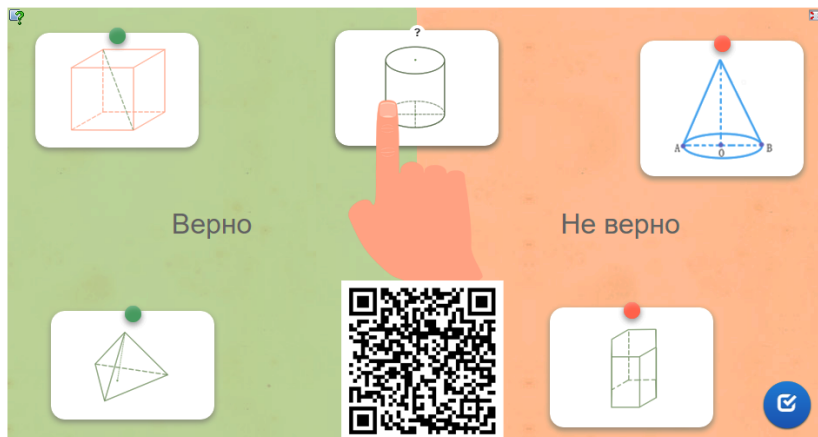


Figure 2. An example of an interactive task.

The main properties of parallel projection were studied in detail in the article [1], where their vector proofs were considered. The author managed to give a fairly simple justification for the fact that any triangle is an orthogonal projection of another triangle similar to an arbitrarily fixed triangle. Using this result, a more compact method was obtained for proving the fundamental Polke-Schwarz theorem, which is the basis for general rules for depicting various polyhedra. However, it does not make much sense to depict individual prisms and pyramids with students, since their base is easily constructed according to the rules described when depicting flat figures. It can also be noted that the standard algorithm is used to create images of a cylinder, cone, and sphere. The most important thing is to teach students to construct complex configurations from polyhedra and round bodies. In order to do this, it is necessary to create primary visual images in students, which can be obtained by demonstrating the corresponding virtual models. For this purpose, it is convenient to use the Geogebra computer program, which allows you to explore the features of the arrangement of volumetric figures in space and identify the properties that are necessary for their image. The following problem can be given as an example.

Problem 1. Construct an image of a regular quadrangular pyramid inscribed in a cone.

Solution. Note that the cone and the pyramid have a common vertex S . The base of the pyramid is a square $ABCD$ and the base of the cone is a circle γ with the center at the point O , described about this square, and the diagonals of the square serve as perpendicular diameters of the circle. Now we sequentially construct:

- 1) An image of a cone, on which the point S is the image of the apex of the cone, the ellipse γ – the image of the circle of the base, O – the image of its center.
 - 2) Conjugate diameters AC and BD of the ellipse γ .
- Then $SABCD$ is the image of this pyramid (Fig. 3).

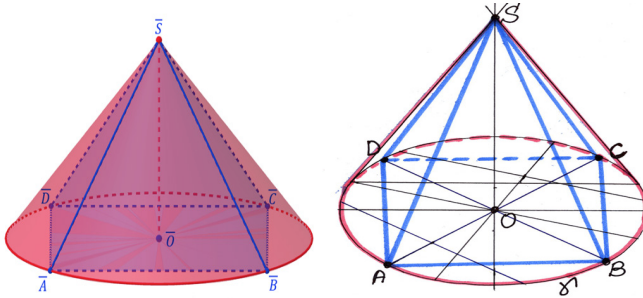


Figure 3. Drawing for Task 1.

Particular attention should be paid to the “axonometry” section, where the main emphasis is on the methods of specifying points, lines and planes in drawings. In this article, we consider special constructions that are used to solve so-called positional problems, a special case of which is the construction of sections of polyhedra. In this case, it is necessary to strive for a certain unification of the drawings made on the common board and in student notebooks. It is meant that in this case the uniformity of recording individual stages of solving educational problems and their justification will be guaranteed. It is for this purpose that it is recommended that all constructions be performed on pre-prepared and printed templates. As an example, consider the following problem.

Task 2. A quadrangular prism $ABCD A_1 B_1 C_1 D_1$ is given, a point X lying outside the prism, a point Y in the plane of the face $ABB_1 A_1$ and a point Z in the plane of the upper base $A_1 B_1 C_1 D_1$. Construct a section of this prism by the plane XYZ .

Solution. First, through points X, Y, Z we draw lines parallel to line AA_1 and mark points X_0, Y_0, Z_0 of intersection of these lines with the plane of the lower base of the prism. Note that point X_0 can be chosen arbitrarily outside quadrilateral $ABCD$, point Y_0 lies on edge AB , and point Z_0 satisfies the condition $\overrightarrow{ZZ_0} = \overrightarrow{A_1 A}$. Thus, all elements of the drawing are given. The idea of further solving the problem is to construct a trace of the section plane. To do this, we sequentially construct:

- 1) Line s of intersection of plane XYZ with the plane of the lower base (trace of plane XYZ). This line passes through point S_1 of intersection of lines XZ and $X_0 Z_0$, as well as through point S_2 of intersection of lines YZ and $Y_0 Z_0$.

- 2) Line a of intersection of plane XYZ with the plane of face $ABB_1 A_1$. This line passes through point Y and point S_3 of intersection of line AB with trace s .

- 3) Points T_1 and T_2 of intersection of edges AA_1 and BB_1 of line a .
 - 4) Line b of intersection of plane XYZ with plane of face BCC_1B_1 . This line passes through point T_2 and point S_4 of intersection of line BC with trace s .
 - 5) Point T_3 of intersection of edge CC_1 of line b .
 - 6) Line c of intersection of plane XYZ with plane of upper base. This line passes through point Z parallel to trace s .
 - 7) Points T_4 and T_5 of intersection of edges C_1D_1 and A_1D_1 of line c .
- Then pentagon $T_1T_2T_3T_4T_5$ is the required section (Fig. 4).

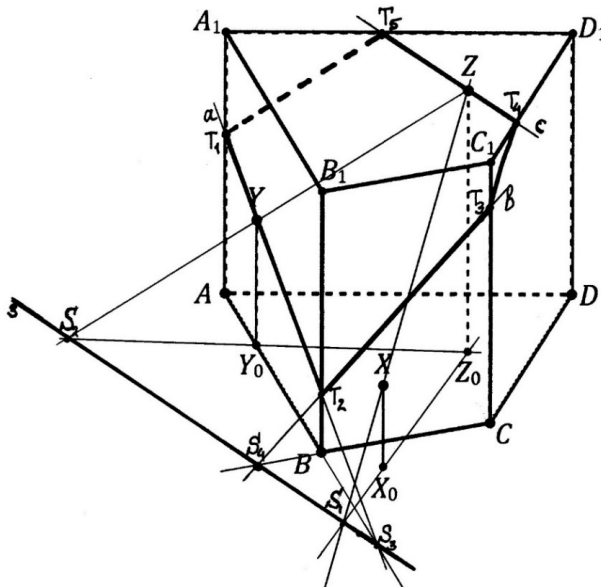


Figure 4. Drawing for Task 2.

Conclusion. In order to optimize the process of teaching students in higher education institutions, modern curricula provide for a reduction in the number of hours intended for lectures in favor of practical classes. This circumstance requires the development of new approaches to teaching geometry in general and image methods in particular. It is necessary to structure the course in such a way that its content is sufficiently convincing and logical, as well as accessible to all students for practical use. This article provides examples that allow the implementation of these requirements in the study of descriptive geometry. Also, specific recommendations were given here on the use of strict theoretical justifications in the process of solving specific practical problems. In addition, the possibilities

of using modern computer technologies were considered in accordance with the general recommendations from the article [2]. As a result, students will be able to more effectively observe and determine the properties of stereometric figures necessary for creating their images.

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海南自贸港建设背景下教育交流在中俄人文交流中的作用探究
**RESEARCH ON THE ROLE OF EDUCATIONAL EXCHANGE
IN CHINA-RUSSIA CULTURAL EXCHANGE UNDER
THE BACKGROUND OF HAINAN FREE TRADE PORT
CONSTRUCTION**

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摘要. 本文聚焦海南自贸港建设背景下教育交流在中俄人文交流中的作用。先阐述海南自贸港建设的战略意义、目标及政策优势，凸显其开放前沿地位。再剖析中俄人文交流现状，展现多领域合作成果。深入探究教育交流的作用，包括促进文化理解包容、培养国际化人才、推动教育创新发展等。同时分析自贸港为教育交流创造的契机，以及教育交流对自贸港建设的助力。并且直面资源不均等挑战，提出应对策略。最后展望未来，坚信中俄教育交流将深化，助力两地发展与人类命运共同体构建。

关键词: 海南自贸港; 人文交流; 教育交流; 国际交流合作

Abstract. *This paper focuses on the role of educational exchange in China-Russia cultural exchange under the background of the construction of Hainan Free Trade Port. It first elaborates on the strategic significance, goals and policy advantages of the construction of Hainan Free Trade Port, highlighting its position as the frontier of opening up. Then it analyzes the current situation of China-Russia cultural exchange, showing the achievements of cooperation in various fields. It deeply explores the role of educational exchange, including promoting cultural understanding and tolerance, cultivating international talents, and promoting the innovative development of education. At the same time, it analyzes the opportunities created by the free trade port for educational exchange and the assistance of educational exchange to the construction of the free trade port. It also directly faces the challenges of uneven resources and proposes coping strategies. It is firmly believed that China-Russia educational exchange will be*

deepened and will help the development of the two places and the construction of a community with a shared future for mankind.

Keywords: *Hainan Free Trade Port; cultural exchange; educational exchange; international exchange and cooperation.*

1. Introduction

In the context of globalization, international exchanges and cooperation are becoming increasingly close. As a bridge of communication between countries, cultural exchange is of great significance in promoting mutual understanding and enhancing friendship. With the acceleration of China's opening up to the outside world, the construction of Hainan Free Trade Port has become the frontier of deepening reform and expanding opening up. With its unique policy advantages and superior geographical location, it has built a new pattern of all-round opening up.

At the same time, as comprehensive strategic 协作伙伴, China and Russia have extensive and booming cultural exchanges in many fields, injecting impetus into the bilateral relations. Educational exchange, as the core of cultural exchange, plays a key role in cultivating international talents and other aspects. In this context, it is of great practical significance to explore the role of educational exchange in China-Russia cultural exchange in the construction of Hainan Free Trade Port. On the one hand, it is necessary to clarify the opportunities and platforms provided by Hainan Free Trade Port for China-Russia educational exchange and how to attract Russian educational resources to promote cooperation; on the other hand, it is necessary to discuss the feedback effect of China-Russia educational exchange on the construction of Hainan Free Trade Port. The purpose of this paper is to analyze its multiple roles and provide theoretical and practical references for the coordinated development of the two places.

2. Current Situation of China-Russia Cultural Exchange

China-Russia cultural exchange has a long history. The ancient Silk Road opened the prelude to cultural exchange. Although the means of communication were limited at that time, it laid the foundation for the follow-up. Since modern times, the fields of cultural exchange between the two sides have continuously expanded. After the founding of the People's Republic of China, the cooperation in many fields has been deepened, and the foundation of public opinion for friendly relations has been firmly established.

Educational exchange, as the core driving force of China-Russia cultural exchange, has achieved remarkable results. The scale of two-way international students between China and Russia has increased. By December 2023, more than 44,000 Chinese students were studying in Russia and more than 12,000 Russian students were studying in Chinese universities. They have become cultural ambassadors. Confucius Institutes have taken root in Russia. There are 19 Confucius

Institutes and 4 Confucius Classrooms in Russia, offering a variety of Chinese language courses and holding rich cultural activities, arousing the interest of the Russian people in the Chinese language and Chinese culture. Tourism exchange is also a hot spot. The tourism cooperation between the two countries has deepened and the measures for facilitating tourism have been implemented. China and Russia are important source countries for each other. In 2023, the number of Russian tourists to China reached 997,900 and the number of Chinese tourists to Russia reached 477,000. The tourists from both sides visited each other's scenic spots and historical sites, enhancing mutual understanding.

In addition, China and Russia have also carried out extensive and in-depth cooperation in the fields of culture, science and technology, sports, media, etc., jointly tackling difficult problems, exchanging skills and techniques, and opening a window for the two peoples to understand each other through news reports. The all-round, multi-level and wide-ranging pattern of cultural exchange has injected impetus into the friendship between the two countries.

3. The Key Role of Educational Exchange in China-Russia Cultural Exchange

3.1 Promoting Cultural Understanding and Tolerance

Language is the entry point of China-Russia educational exchange. The Russian major in universities in Hainan Free Trade Port has developed well. Take the radio and television directing major jointly run by Hainan Normal University and St. Petersburg State University of Film and Television as an example. A large number of Russian courses are set up in the first grade, and the teaching staff is excellent, creating an immersive learning environment for students, helping them overcome language difficulties and have an in-depth understanding of Russian culture.

Cultural courses are an important carrier for spreading the essence of Russian culture. Universities in Hainan offer courses such as Russian history, literature and art. For example, the Russian history course helps students explore the roots of national character, the literature course enables students to feel the charm of literature, and the art appreciation course enables students to appreciate the diversity and profundity of culture, reducing cultural misunderstandings and prejudices.

Academic exchanges set up a stage for the collision of ideas. Regularly held academic seminars and forums attract scholars from both countries. For example, at the seminar on "Comparison of the Development of Cultural Industries in China and Russia", scholars from both sides shared their experiences and inspired each other, providing new ideas for the cooperation of cultural industries and deepening the understanding of each other's cultural connotations and contemporary development.

3.2 Cultivating International Talents

The joint training programs of Chinese and Russian universities transport suitable talents to Hainan Free Trade Port. For example, the Ural College of Hainan Vocational College of Economics and Trade cooperates with the Ural Federal University of Russia, focusing on the majors urgently needed by the free trade port. Students majoring in tourism management integrate the experience of China and Russia and devote themselves to the planning and market expansion of tourism projects; students majoring in financial management integrate the relevant knowledge of China and Russia and lay the foundation for the financial management talents of multinational enterprises.

There are many highlights in vocational education cooperation, providing skill support for the industrial upgrading of the free trade port. Hainan Dongfang New Silk Road Vocational College meets the needs of the modern service industry of the free trade port and cooperates with Russian vocational colleges, introducing Russian teaching resources to strengthen teaching. Dongfang City Vocational and Technical School, centering on the local industry, exchanges teachers and students with Russian colleges for practical training and shares teaching resources, promoting the development of chemical, agricultural and other industries.

3.3 Promoting Educational Innovation and Development

China-Russia educational exchange has brought new ideas and models to the education of Hainan Free Trade Port. The teaching methods of Russia, which focus on the cultivation of practical and innovative thinking, have been implemented in the free trade port. For example, the physics experiment class of Hainan Normal University has implemented project-based teaching to stimulate students' innovative potential; interdisciplinary integration courses have also been piloted in many schools, broadening the thinking boundaries of students.

The educational informationization means of Russia have injected vitality into the modernization of education in the free trade port. The institutions in the free trade port have introduced the online learning system of Russia and other things. During the epidemic period, with the help of its technology, the online teaching has achieved a smooth transition, promoting the reform and innovation of the education and teaching mode and improving the internationalization and informationization level of education.

4. New Opportunities for Educational Exchange Brought by the Construction of Hainan Free Trade Port

4.1. Policy Advantages Attracting Resource Aggregation

The special policies of Hainan Free Trade Port attract the aggregation of China-Russia educational exchange resources. The tax preferential policy enhances the enthusiasm of Russian educational institutions to settle in. The “zero tariff” policy reduces the import cost of educational equipment and other things, pro-

viding hardware support for its establishment of branch schools or joint running schools in Hainan. The preferential policies of enterprise income tax and personal income tax attract Russian educational talents and investment, providing financial guarantee for educational cooperation projects. The trade and investment facilitation policy broadens the channels of educational exchange. The mode of “liberalization at the first line and control at the second line” makes the import and export business of education convenient and the cross-border capital flow free and convenient, ensuring the stability of the capital chain of educational cooperation projects.

4.2. Industrial Demand Generating Cooperation Motivation

The industrial development of Hainan Free Trade Port has a great demand for professional talents, generating the motivation for China-Russia educational cooperation. In the field of science and technology, the industries such as aerospace and digital economy are rising. Chinese and Russian universities jointly open relevant majors and jointly build scientific research laboratories. In the field of economy and trade, the development of the economy and trade industry of the free trade port urgently needs compound talents. The economy and trade majors of Chinese and Russian universities jointly customize the characteristic curriculum system and build a platform for collaborative innovation of industry-university-research-application, helping the enterprises in the free trade port to expand the market. The tourism industry is the key cooperation direction. Hainan, as a tourist destination, attracts many Russian tourists. The tourism majors of China and Russia have in-depth cooperation, develop characteristic courses, jointly carry out tourism planning and product research and development, improve the quality of tourism services and create a new highland of tourism exchange.

4.3. Geographical Advantages Expanding Exchange Space

The unique geographical location of Hainan endows it with geographical advantages in China-Russia educational exchange. In terms of transportation, as an important node of the Maritime Silk Road, the sea, land and air transportation network is developed. The airport has opened direct flights to Russian cities, and the sea transportation and intra-island transportation are convenient, facilitating the exchanges of teachers and students and the flow of educational resources.

Based in Hainan, it can also radiate the surrounding areas. By holding the China-Russia Education Sub-Forum at the Boao Forum for Asia, gathering educational elites. Relying on the Pan-South China Sea Economic Cooperation Circle to build a China-Russia-ASEAN educational exchange platform and carry out educational assistance, etc., enhancing the international influence of education in Hainan Free Trade Port and making the results of educational exchange benefit more regions.

5. Challenges and Coping Strategies

5.1. Challenges

Under the background of the construction of Hainan Free Trade Port, although China-Russia educational exchange has developed, it also faces challenges. The distribution of educational resources is uneven. The high-quality educational resources in Hainan are concentrated in cities such as Haikou and Sanya and the eastern coastal areas. The educational facilities and teaching staff in the remote mountainous areas and rural areas in the central and western regions are weak, restricting the in-depth development of educational exchange and difficult to meet the needs of the balanced distribution of talents in the free trade port.

The lack of experience in international school management. When some universities cooperate with Russian universities in running schools, there are problems such as curriculum connection, credit recognition and conversion, and teaching quality monitoring. In terms of student management, it is difficult to deal with the differences in culture and learning habits, affecting the improvement of the level of educational exchange.

Cultural differences bring challenges. The cultures of China and Russia are different in values, ways of thinking, educational concepts and other aspects. Reflected in the classroom interaction and other links, it is easy to cause misunderstandings and confusion among teachers and students, affecting the smooth progress of educational exchange.

5.2. Coping Strategies

To cope with the above challenges, it is necessary to make concerted efforts from multiple parties. At the government level, strengthen the overall planning of educational resources, implement the balanced allocation plan, tilt to the central and western regions and rural areas, set up special funds to improve the hardware facilities of schools, improve the treatment of rural teachers and attract talents; improve the legal and policy system of international school running, clarify the approval process and other things, and guide the standardized development of educational exchange.

Educational institutions should strengthen their own capacity building. Universities should build a platform for the docking and discussion of Chinese and Russian courses, optimize the curriculum system, formulate the credit recognition criteria and establish a teaching quality monitoring group; carry out cross-cultural training projects, improve the cross-cultural adaptability of teachers and students and create a multicultural campus atmosphere.

Teachers and students, as the main body of educational exchange, should improve their cross-cultural communication literacy. Teachers participate in training and seminars, learn advanced concepts and skills, integrate multicultural elements and innovate teaching methods; students cultivate an open mind and the ability of

autonomous learning, participate in international exchange activities and exercise cross-cultural communication skills to help the talent cultivation and cultural exchange in Hainan Free Trade Port.

6. Conclusion

Educational exchange is of crucial importance in China-Russia cultural exchange and is a key force in promoting the mutual understanding and common development of the two peoples. Under the background of the construction of Hainan Free Trade Port, its role is further manifested and expanded. Through educational exchange, the cultures of China and Russia are deeply blended, creating a new situation for the cooperation of cultural industries; cultivating high-quality talents for Hainan Free Trade Port, supporting the industrial upgrading and economic take-off; introducing the concepts and technologies of Russia and promoting the modernization of education. Open a new chapter of the two places working hand in hand and help build a community with a shared future for mankind.

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VG Petrova 对智力障碍学童语言发展的概念方法

**CONCEPTUAL APPROACHES OF VG PETROVA TO SPEECH
DEVELOPMENT OF SCHOOLCHILDREN WITH INTELLECTUAL
DISABILITIES**

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注释。本文讨论了 V.G. Petrova 的言语发展概念方法,关注的重点是智力障碍学童的心理活动和个人发展所产生的变革性影响。结果表明,有针对性的研究结果可作为寻找适用于现代教育实践的教学解决方案的基础。

关键词: V.G. Petrova 的科学贡献、智力障碍学童、沟通实践、方法技术、言语发展。

Annotation. *The article discusses conceptual approaches V.G. Petrova to speech development, of interest in the context transformative impact on the mental activity and personal development of schoolchildren with intellectual disability. It has been shown that the results of targeted studies serve as the basis for search for didactic solutions applicable to modern educational practice.*

Keywords: *scientific contribution V.G. Petrova, schoolchildren with intellectual disabilities, communication practice, methodological techniques, speech development.*

The contribution of the outstanding Russian scientist Vera Georgievna Petrova (1921-2011) to domestic special psychology and correctional pedagogy is indicated by numerous areas of her scientific work: research into the thinking and speech of schoolchildren with intellectual disabilities, identifying the internal resources of their mental development; determining appropriate forms of pedagogical influence; study of psychological characteristics of children with hearing impairments, development of verbal speech in deaf schoolchildren; justification influencing the influence of remedial education and differentiated approach in the organization of the educational process [5].

The appeal to the personality of an outstanding scientist in the person of V.G. Petrova is of extreme interest to a wide range of specialists involved in issues of education, upbringing, development and social and labor adaptation of schoolchildren with intellectual disabilities. Immersion in the scientific field designated by the topic leads to a more thorough analysis of conceptual approaches V.G. Petrova to the speech development of schoolchildren with intellectual disability and consideration of the possibility of finding new didactic solutions in relation to modern educational practice.

To the initial provisions of the constructed V.G. Petrova The scientific research that had developed at that time can be attributed to the concept. In particular, it was noted that the most favorable influence on the development of schoolchildren with intellectual disabilities is exerted by pedagogical conditions that smooth out the violations of their cognitive activity when education is brought closer to life and work activity (*L.S. Vygotsky, V.V. Voronkova, G.M. Dulnev, L.V. Zankov, Zh.I. Shif, etc.*).

The results of targeted research have contributed to the classification of speech as one of the most powerful means of developmental influence through the regulation of the consistent acquisition of social experience by children, their perception of the surrounding reality, and communication with adults and peers (*L.S. Vygotsky, M.F. Gnezdilov, A.V. Zaporozhets, I.P. Kornev, M.I. Lisina, V.I. Lubovsky, and others*).

At the same time, the absence of long-term observation of speech development of children with this nosology was noted. Possessing unique research abilities, V.G. Petrova assessed this problematic situation and systematized approaches to its solution, presenting the concept of speech development of schoolchildren with intellectual disabilities [2].

V. G. Petrova's conceptual approaches to the speech development of children of this nosological group were based on the idea of speech as one of the most important and necessary conditions for the transformative impact on their mental activity and personal development. The problem was based on the need to resolve issues related to the characteristics of their speech communication and speech regulation of activity [2, p.1]. The target concept of the conducted research was aimed at improving the process of children's acquisition of their native language based on the potential of remedial teaching. The tasks set were aimed at characterizing the process of formation of independent speech of children throughout the entire period of school education and specifying the regulatory function of speech in the organization of their cognitive activity [2, p.2].

Having designated Thus general direction of her research, V.G. Petrova develops key approaches to solving the tasks set. Two methodologically adapted plans of the planned actions were presented:

- conducting an in-depth study of the step-by-step development of coherent oral and written speech of schoolchildren with intellectual disabilities. Particular attention was paid to the variability of the choice of speech material and its influence on the development of speech activity of students. Options were proposed: changing the topic, using the plan, techniques for increasing motivation and activating speech utterances. A correlation was noted between the oral and written speech of students.

- determination of the influence of verbal assistance on the formation of verbal-logical thinking of students when students perform subject-practical actions [2, p. 2]. It is impossible not to agree that these are the most significant approaches to the development of speech of students with intellectual disabilities, representing the scientific school of V.G. Petrova.

The methodological side of Vera Georgievna's research is reflected in the projection of the present and the future. What is perceived as indisputable today in the practice of corrective education of schoolchildren with intellectual disabilities was tested by Vera Georgievna in various years of study and recorded as methodological recommendations.

Let us focus on some methodological solutions. In particular, V. G. Petrova very accurately noted that children with intellectual disabilities are surrounded by people who speak and by the beginning of school education have experience of communicating with close adults and peers. At the same time, their practice of verbal communication is not active enough. Considering the difficulties in children's active speech and their understanding of addressed speech, the teacher should not speak for a long time and use complex speech patterns. Questions, demands and explanations should be given concisely. It is also necessary to introduce specific supports that attract children's attention and help them understand what needs to be done [3, p. 8].

Difficulties in mastering the phonetic-phonemic system of the native language by children with intellectual disabilities, as before, are the subject of close attention of today's speech therapists and teachers. At each lesson of speech practice, teachers conduct articulation gymnastics, create a special educational and communicative environment for the speech development and communication of children. Vera Georgievna focused on the pronunciation side of speech and proposed to intensify work on intonation, speech tempo and its expressiveness, using specially selected speech material and available types of activities: learning children's poems, fables, nursery rhymes, pronouncing phrases in different emotional correlations, dramatization of fairy tales, involvement in dialogue [3, p. 18]. These and other recommendations have firmly entered into educational practice and subsequent methodological publications [1; 4].

Teachers working in special schools today know very well that vocabulary work with students is carried out throughout the entire period of study. Neverthe-

less, the mention that “the enrichment of the vocabulary of a mentally retarded child with new words is carried out under the influence of training together with the clarification of the meanings of words, ideas and concepts already known to them...” [3, p. 29] will not be an exaggeration.

Due to reduced speech activity, insufficient development of the emotional and volitional spheres, poverty and instability of interests, special importance is attached to work aimed at encouraging speech expression in children with intellectual disabilities. V.G. Petrova advised using techniques and means, distinguishing them into:

- stimulating speech activity (support in the form of visual aids or a plan, reference words, tasks for grouping words, identifying an extra word);
- and supporting speech activity (questions like: “What’s next?”, “What else?”, motivating statements: “Go on. We’re listening to you”, solving problem situations: “Why...? If...?”) [3, p. 49].

The pattern established by V.G. Petrova between the development of oral and written speech of schoolchildren with intellectual disabilities is noteworthy. In her opinion, mastering written speech improves the mental activity of students, expands their sphere of communication and opportunities for acquiring new knowledge. At the beginning of school education, its development is conditioned by the development of oral speech, but in senior grades it is written speech that organizes and regulates the oral speech of students. The types of written presentations proposed by V.G. Petrova (essays on a picture, on a given topic, on a given topic according to a plan) are variable, reflect topics that are vital for schoolchildren, are methodically developed and applicable to modern educational practice [3, p. 133]; [4, p. 114].

In our opinion, examples of the inclusion of speech in the cognitive activity of schoolchildren with intellectual disabilities are of practical significance. V.G. Petrova noted that verbal instructions orient children to perform a specific action; teacher explanations when accompanying the perception of an object influence the preservation of the image of the object in memory; practical actions contribute to the recognition of the qualities and properties of the examined object, but are not a source of knowledge. Meanwhile, a significant restructuring occurs when the internal plan and external conditions of the cognitive activity of students change. The reference points in their cross-analysis are:

- activation of mental activity by bringing children under the speech regulation of the reproduced actions, reflection of the plan of the actions performed, the installation of obtaining new information about the subject (internal plan of cognitive activity) [3, p. 72];
- organizing conditions that facilitate the unification of speech and activity into a single functional system (external conditions – encouraging students to plan

upcoming activities, developing the ability to talk about the work done with a demonstration of the objects or tools used, compiling verbal reports on the activities performed) [3, p. 83].

Refracting the provisions formulated by V.G. Petrova through the prism of the present, we discover in ourselves the possibility of assessing our professionalism, putting ourselves in the position of a researcher and practitioner. Testing a specific and clear instruction for action, you are surprised every time - it works. In our opinion, it works precisely because Vera Georgievna Petrova's conceptual approaches to speech development can be generated in her professional activities.

The highest level of professionalism of V.G. Petrova and her recognition as an outstanding scientist of our time is evidenced by the practical implementation of the considered conceptual approaches in all correctional educational organizations. Based on the presented provisions, the issue of their productive use is relevant in the professional activities of not only teachers of correctional schools, but also teachers of inclusive educational practice.

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残疾儿童的训练：泰拳教练的方法和方式
**TRAINING FOR CHILDREN WITH DISABILITIES: APPROACHES
AND METHODS OF A TRAINER IN THAI BOXING**

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注释。本文讨论了残疾儿童泰拳训练的具体内容。它描述了旨在创造安全和激励训练环境的包容性方法。它提供了关于泰拳对儿童身体、情感和交流发展影响的研究数据。它为训练者提供了建议，包括根据个人需要调整练习和创造良好氛围的方法。

关键词：泰拳、残疾儿童、包容性教育、康复、适应性方法。

Annotation. *The article discusses the specifics of Thai boxing training for children with disabilities. It describes inclusive approaches aimed at creating a safe and motivating environment for training. It provides research data on the impact of Thai boxing on the physical, emotional and communicative development of children. It provides recommendations for trainers, including methods for adapting exercises to individual needs and creating a favorable atmosphere.*

Keywords: *Thai boxing, children with disabilities, inclusive education, rehabilitation, adaptive methods.*

The relevance of the topic of Muay Thai training for children with disabilities is due to the growing interest in inclusive methods of physical education and rehabilitation. Based on statistical data from Form No. 3-AFK, the number of people involved in sports training as of January 1, 2023 was 209.4 thousand people, of which 87.5 thousand people were aged 6 to 18 years [1]. Muay Thai as a type of martial arts offers unique opportunities for developing physical skills, self-confidence and social interactions among children with various disabilities. However, martial arts classes require adaptation that takes into account their physical and psychological characteristics. The work of a trainer in this area requires not only knowledge of Muay Thai technique, but also an understanding of the specifics of working with children with disabilities. It is important to take into account

the individual needs of each child and create a suitable atmosphere for training. This article presents an analysis of key aspects of the training process, methods of working with children with various forms of disabilities and recommendations for trainers.

According to L.I. Akatov, “The activity-based approach to social rehabilitation presupposes the development and correction of a child with disabilities only in the process of activity through special training, during which the child masters psychological means that allow him to exercise control and management of his internal and external activity” [2].

Children with disabilities are a diverse group that includes children with various physical and mental disabilities. Each category has its own characteristics and needs, let’s look at each of them:

Cerebral palsy (CP):

Main difficulties: limited mobility, low level of coordination, muscle hyper-tonicity.

Special needs: Stretching exercises, gentle balance work, minimizing impact loads.

Example: Using special targets to hit can help children develop coordination without too much physical exertion.

Autism:

Main difficulties: communication difficulties, poor visual contact, hypersensitivity to sounds.

Special needs: game elements, encouraging interest through visual support.

Example: Using colored targets or toys can attract a child’s attention and help him focus on the task.

Down syndrome:

Main difficulties: decreased muscle tone, insufficient concentration.

Special needs: regular repetition of exercises, emphasis on developing teamwork.

Example: Creating team games can help develop social skills in children with Down syndrome.

The variety of forms of disorders requires flexibility from the coach in planning and implementing the training process. Each child is unique, and his success should be assessed individually.

According to S. L. Rubinstein, “activity is determined by the object itself, but not directly, but through “internal” laws” [3].

Training for children with disabilities requires a comprehensive approach:

1. Individualization of training.

Each training session should begin with an analysis of the child’s current state. For example:

- if you are very tired, you can reduce the intensity of your workouts or replace complex elements with game elements;
- it is important to take into account the level of physical fitness of each child and his emotional state before starting training.

2. Creating motivation.

Psychological support is the key to successful work with children with disabilities. The trainer can use:

- exercises with bright elements (colored paws or mats) to make the exercises more attractive;
- rewards for achievements (praise or participation badges) can significantly increase children’s motivation;
- It is also important to use positive reinforcement – for example, praising the child for efforts regardless of the result.

3. Group work

Group activities help develop social skills. For example:

- children with autism can observe their peers and repeat their actions;
- children with Down syndrome become group leaders, inspiring others with their enthusiasm;
- creating a friendly atmosphere in the group helps improve interaction between children.

Training programs for children with disabilities include three stages:

1. Preparatory stage.

Aimed at warming up muscles and adapting to the load:

- slow strikes on soft targets to develop technique without the risk of injury;
- stretching exercises with the support of a trainer help prepare muscles for stress.

2. The main stage.

Includes exercises to develop basic skills:

Coordination ladder exercises help improve motor skills.

- the simplest punches on bags with minimal load teach the basic techniques of Thai boxing.

3. The final stage.

Relaxation and breathing practices help children recover:

- gentle stretching helps to relax muscles after active training;
- Breathing exercises can help children calm down after a lesson and prepare for the next one.

According to a study by the Moscow School of Martial Arts (2024), a Thai boxing training program for children with disabilities showed the following results:

- 85% of children with cerebral palsy showed improved coordination;

- children with autism began to participate more actively in group tasks;
- parents of 90% of children noted an improvement in the child's emotional state.

These results highlight the importance of adapting the training process to the individual needs of children and confirm the effectiveness of Muay Thai as a rehabilitation tool.

Based on this methodology, some recommendations can be made for trainers.

What should be done:

- adapt exercises to the individual characteristics of the child;
- create a positive atmosphere during classes;
- use game elements to maintain interest in the lessons.

What to avoid:

- comparing children with each other – this can negatively affect the child's self-esteem;
- excessive demands on children; it is important to remember that each child has his own unique abilities and limitations.

Thai boxing for children with disabilities is an effective tool for rehabilitation and socialization. An individual approach, attention to the needs of children and proper organization of the training process contribute to the improvement of their physical condition and development of social skills. It is important to continue to explore the possibilities of using Thai boxing as a means of integrating children with disabilities into society. Parental support also plays an important role in the success of these programs; therefore, involving parents in the learning process can significantly increase the effectiveness of classes.

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开发用于自动识别哈萨克语专名学文本的语言模块
**DEVELOPMENT OF A LINGUISTIC MODULE FOR AUTOMATIC
RECOGNITION OF THE KAZAKH TEXT ON ONOMASTICS**

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注释。在计算机语言学和语料库语言学的交叉领域，识别专有名词和 onims 的问题如今越来越重要。自动识别专名被认为是一种重要的工具，它可以让您深入地正确处理文本。这项工作的目的是提供有效的方法，以便在自动文本识别系统中正确识别和处理 onims 和专有名词。特别是，计划开发语言模型和算法来解决与哈萨克语 onims 相关的各种问题，并通过特定来源（哈萨克语 onims 数据库、地名和人名列表）丰富它们。

该语言模块的目的是自动处理哈萨克语文本中发现的专有名词和 onims 的详细信息，识别它们的类型和拼写规范。专名模块是构建哈萨克语数据、进行语义分析和有效使用信息检索系统的重要步骤。

关键词：姓名学、语言模块、自动识别、人名学、地名学、onims、哈萨克语文本、信息技术。

***Annotation.** The problem of recognizing proper names and onims is gaining relevance today at the intersection of computer linguistics and Corpus Linguistics. Automatic recognition of onomastic names is considered an important tool that allows you to process text in depth and correctly. The purpose of this work is to provide effective methods for the correct identification and processing of onims and proper names in automatic text recognition systems. In particular, it is planned to develop language models and algorithms to solve various problems related to onims in the Kazakh language, enrich them with specific sources (database of onims in the Kazakh language, lists of toponyms and anthroponyms).*

The purpose of this linguistic module is to automatically process detailed information about proper names and onims found in texts in the Kazakh language, recognize their types and spelling norms. Onomastic modules are an important step for structuring data in the Kazakh language, conducting semantic analysis, and effectively using information retrieval systems.

Keywords: *onomastics, linguistic module, automatic recognition, anthroponymics, toponymics, onims, texts in the Kazakh language, information technologies.*

Information technologies are active in all areas of society, including the humanities. In connection with the comprehensive study and analysis of various onomastic texts, units, the conduct of onomastic research is associated not only with methodological, but, most importantly, with technical difficulties. The recognized fact is that the way to improve the effectiveness of linguistic research is to launch IT processes, multimedia, and the internet.

Onomastics is a branch of linguistics that studies proper names. Onomastics is divided within itself into two areas. One of them is anthroponymy as an object of study of human names, and the other is toponymy as an object of study of Geographical Names. Anthroponymics include a person's first and last name, father's first name, person's real name, nickname, ethnoanthroponyms, and anthroponyms. Toponymics include Place and water names, toponyms are divided among themselves into oikonoms' hydronyms' oronyms' urbanonyms' necrononyms, exonyms, horonyms, etc. Onomastics, in addition to these two major branches, includes ethnonymics, astronimics, zoonimics, theonymics, and phytonymics.

In the Kazakh language, the field of onomastics was first studied in the works of professors T. Zhanuzak, A. Abdrakhmanov, K. Rysbergen, G. Madiyeva, B. Tleuberdiyev, B. Abduali, S. Imanberdiyeva and others. Reference books of names of people, names of places and places have been published. The study of the history of the origin of onomastic units in connection with the worldview, culture, traditions of the people is of interest not only to specialists-correspondents, but also to the general population. It is clear that everyone wants to know the history of the origin of their name and native place names. Such information is now found in abundance not only in historical and ethnographic works, but also in dissertation works that are being studied in the field of linguistics. In order to transmit information about such proper names of the Kazakh people from generation to generation, to store them in the information fund, the Institute of Linguistics named after A. Baitursynov is engaged in the creation of an onomastic Corps as part of the National Corps of the Kazakh language. The onomastic Corps contains a lot of language information about proper names/onim (word formation), Geoinformation, cultural and cognitive information. Such annotations, compiled in the database of the onomastic Corps, will in the future describe information about proper names found in any text in the Kazakh language. Consequently, the onomastic Corpus base will be a linguistic resource for automatic text recognition.

The problem of revealing the types of proper names, ways of their origin, motivation in naming formation, cultural and cognitive information is studied by the

onomastics branch of linguistics. Onomastics is a branch of lexicology in terms of language levels. In the language, proper names are called onims. Onims are classified into large groups, including human names – anthroponyms, land and water names-toponyms, plant names – phytonyms, etc., and then into microgroups within themselves.

The question of the nature of the proper name (PN) has long been considered by linguists from a theoretical and practical point of view. This issue is especially relevant at the intersection of onomastics and computer and Corpus Linguistics. This is because the semantic designation of corps and automatic text recognition (mat) studies will not only “automatically teach” the machine to find proper names, but they will also need to “understand” the entire text by identifying the type of onims and reading the important information provided in it.

In the Kazakh language, name words are divided into common and proper names. Both proper nouns and common nouns belong to the word class in terms of their relation to the word class. However, the difference between these two groups is that while common names make up vocabulary, proper names are not included in dictionaries as registry units. However, since proper names are also used within the text, linguistic and cultural and cognitive information about them should be known by language practitioners.

PN is an important informational part of the text and therefore requires careful description. At the same time, in machine recognition systems, EE is sometimes transliterated, if in some cases it is transmitted in the original language.

The automatic processing of text in any language has certain difficulties in learning. In particular:

1. onomastic names cannot be given 100 percent in full.
2. PN is given differently than common names in the language (may be enclosed in quotation marks, may consist of one or more elements, initials may be given paid, or may be an abbreviation).
3. PN can also be a homonym with other words in the language, for example, “Ural”. 1. oral. The name is given from the name of the Ural River. *T. Zhanuzak. Directory of Kazakh names. - Almaty: Publishing House "Arys", 2009. – 552 p.* 2. Uralsk. Center of the Ural region, city. It was founded in 1613. It is located on the banks of the Ural River, near the confluence of the Chagan river with it. The word of ancestors: *One hundred volumes. - Astana: "Folio", 2006. Vol.32: Chronicle epics. - 2006. - 400 P.* 3. Uralsk. The name of a man named after the river. The names of the United person are Oralbay, Oralbek, Oralkhan, Oraltai, etc. *Directory of Kazakh names. - Almaty: Publishing House "Arys", 2009. – 552 P.* 4. Uralsk. “I don’t know,” he said. Play in the bar of your Urals and laugh until the Black Earth hides your white face (Aitys). *Dictionary of the Kazakh literary language. Fifteen volumes. Volume 11. / Comp.: Zh. Mankeeva, S. Bizakov, A. Zhunisbek and others-Almaty, 2011. - 752 P.*

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2. Arys. A predatory animal belonging to the marten family, akkis. *Encyclopedic Dictionary of Kazakh traditional culture*. - Almaty: "Dictionary-Dictionary". 1997. - 368 P.
3. Arys. substance. bot. Rye. For example, our collective farm "Rassvet" has only about four hundred hectares of arable land. He himself was also sown and disassembled with arys, barley, flax (X. R.). (*sozdikqor.kz*).
4. Arys. substance. vintage. tribe, tribe, country, people. If the audience joins the lion, who chases the honor (Abay). "What's The Matter?" *Dictionary of homonyms of the Kazakh language*: - Almaty: Publishing House "School", 1988. - 193 P.

The morphological characteristics of onims do not always coincide with common names. These circumstances should be identified at the initial stages of text recognition so that there are no problems in the further course of the case.

In automatic text recognition, there are several ways to designate proper names as onim [1].

The first is that proper names are mostly capitalized in the text. This uppercase letter is a condition for providing a reference to the program as a proper name for words that are capitalized in the text. When a text recognition program encounters uppercase/uppercase words, it first executes a command to search for onim from the onomastic unit database. However, since the capital letter is written at the beginning of a sentence, this condition is not a decisive condition for proper noun distinction (algoritim). However, text recognition can be a way to find features for a program.

The second, in automatic text recognition, can be recognized by giving the program a list of onims. The onim base, compiled with the classification of proper name types, contains the names of people found in the text – anthroponym (conditional sign: Anthrop.), the name of the land-water-toponym (conditional sign: Group.), etc. creates the possibility of marking.

The third, if there are official document texts (contract, decree, order, etc.), is clearly signed at the end of the text. A word written after capital letters followed by a dot will definitely be a 100% proper name. Most often, initials consist of two capital letters with dots, followed by the surname: D. M. Pashan. A. B. Seitbatkal. In some cases, one capital letter is followed by a personal name: A. Zhumanovna, M. Bolatbekovich.

Fourth, sometimes only one capital letter with a dot can replace a person's first and last name or geographical name. For example, the couriers came to Mr. B. Our colleagues went to the city named zh. By the point placed after the capital letter in the sentence, we can know that behind it is the onomastic name.

The onomastic Knowledge Fund is a fund that fully covers human names and geographical names in the Kazakh language, as well as other types of onim.

The first of these algorithms for automatic text recognition is performed only by a program, and to implement the second, it is necessary to classify and list the

onims in the Kazakh language by type and provide them with linguistic, cultural and cognitive information. At the same time, the Department of onomastics of the Institute of Linguistics named after A. Baitursynov has prepared the following linguistic resources for the types of onim.

According to the program, it is necessary to inventory and systematize the system of onomastic knowledge for automatic recognition of the Kazakh text. To do this, first of all, a stock of onomastic knowledge should be accumulated, the types of onims, their norm and image in writing should be combined.

As a source of accumulation of the necessary base for the onomastic knowledge base, published works in the field of onomastics, scientific publications, encyclopedic reference books, regulations were taken as a basis. In particular, the directory of Kazakh names. - Almaty, Arys. - 2009; Anthroponymic dictionary. - Almaty: 2019; "parallel directory of physical and geographical names of the Republic of Kazakhstan in Cyrillic and Latin graphics". - Almaty, 2019; directory of land and water names. - Almaty, Arys. – 2009; other-language onomastic names in the Kazakh language. Reference book-Almaty: 2021; word of ancestors: Centenary.- Astana, Folio. – 2013. (Volume 30); the name of your place - the letter of your country: encyclopedic reference book – Almaty, Aruna, 2006, etc.

Since most of these works are in PDF format, it was first captured on a scanner and converted from it to WORD format. Only after that the base was formed in Excel format.

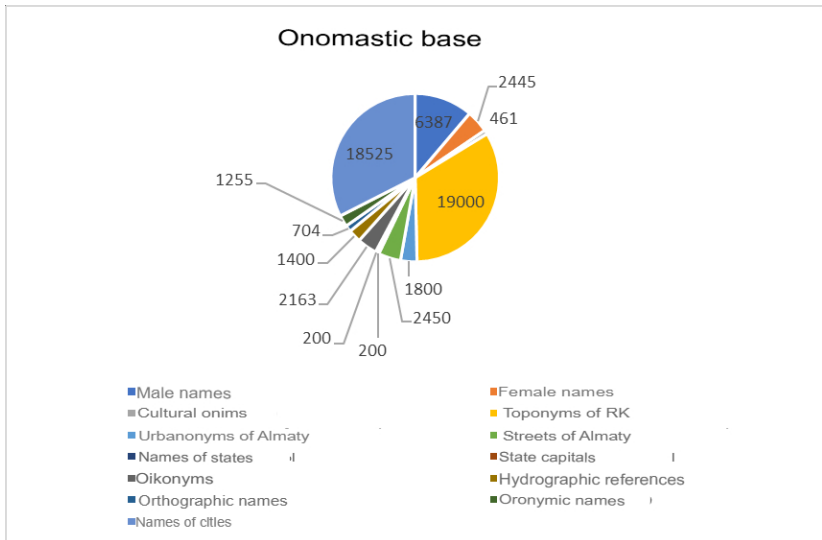


Figure 4. Percentage of the onomastic base

In automatic text recognition, a comprehensive linguistic information about onyms is obtained from the onomastic Corpus (<https://qazcorpus.kz/onomastikalyyq-ishkorpus/index.php?soz=%D1%81%D3%A9%D0%B7>) [2] can be pulled.

Within the framework of this task, the inventory of linguistic knowledge on onomastics necessary for linguistic modules of recognition of graphic language units, elements in the scientific and theoretical essence of the study was carried out. Inventory in onomastics is an inventory of all the basic base names and circulating onomastics names.

Further, onomastic knowledge was accumulated on the development of a text base in the Kazakh language for the development of a program for Optical Character Recognition (hereinafter referred to as rust). On the basis of the collected material, it is necessary to recognize that the word rust is an onomastic name, and it is also visible in KMAT. This base is a necessary base in the process of creating specific IT solutions that turn objects of text sources into digital documents.

Linguistic modeling is the creation of systems or models that can process linguistic information. The tasks of linguistic modeling are: search for certain linguistic data (for example, corpus data); testing hypotheses.

The models used to designate proper names (onyms) in automatic text recognition include different methods and technologies. Here are some of these models:

1. words that begin with a capital letter

Many proper names are capitalized (for example, human names, Geographical Names). Therefore, identifying words that begin with a capital letter is the first step.

2. context of words

Proper names often appear in a specific context. For example, after the mountains of the city, the word “city” is used, after the onyms-the word “mountain”, after the hydronyms-the words “lake, river”. Based on the sentence structure, it can be determined whether certain words are proper nouns.

3. well-known prefixes and suffixes

Some names are distinguished by a well-known prefix (for example, Nur, Bai, Khan, etc.) or a suffix (for example, “- OV”, “- OVA”, “- daughter”, “- son”, “- flower”, “- soul”, “- Beck”, “- rich”, etc.). Such rules help to recognize proper names.

4. lists and bases

A list or database of proper names (for example, toponyms, exonyms, famous persons, cities, states), developed in advance and included in the database, can be used in the process of automatic recognition. Finds matches by comparing the words in the text with the entered list.

5. syntactic rules

The grammatical structure and phrases in the sentence help to identify proper names. For example, “Zhanar” “in the sentence” “My Friend, Zhanar, came today” is a proper noun.

6. *phonetic rules*

Some proper names are also phonetically written with a certain pattern. For example, some names can be written with certain combinations of vowels and consonants. Phonetically, suffixes and prefixes also play an important role. For example: suffixes "OV", "EV": Abaev, Zhumaliyev, Boranov.

7. *semantic context*

Understand which words are proper names, taking into account the meaning and logical connections in the text. By combining these methods, the efficiency of recognizing proper names can be increased [3; 4].

What is general linguistic modeling for? Linguistic modeling helps the programmer (programmer) solve the following problems:

- facilitates the selection of a suitable type of linguoanalysis;
- allows you to predict the effectiveness of the selected type of analysis and eliminate alternatives;
- provides ready-made algorithms that optimize the process of computer processing of text.

Our task is to provide the programmer with the necessary linguistic module for the process of creating the necessary base and automating this base.

First of all, the recognizable text falls into the linguistic processing module.

It determines the type of onim, for which it first filters the characters given in the text. In some cases, spelcheckers (spelling and punctuation error correction modules) are used. After that, the text is formatted, that is, the words in the text are recognized, and if they are not recognized, they begin to be divided into characters.

In the process of recognizing onims, first of all, the importance is attached to symbols. Attention is paid to the beginning of a paragraph, sentence, at what point in the sentence the type of onym stands, writing. If there is a type of onim included in the onomastic knowledge base, it will not be difficult for an automaton to recognize it. Here it is necessary to focus on finding onim and correctly matching it with the onim type in the base.

At the present stage, Kazakh names are distorted in various document sources, are used in two or three or more versions, without following the spelling rules, that is, the standard version of names is ignored. For example: the name of one of the largest physical, geographical and natural-historical regions of Kazakhstan-Saryarka, in addition to the basic norm, also uses the image of Sary – Arka // Sary Arka. This situation occurs not only in toponyms, but also in anthroponyms. For Example: Maryam/Maryam/Maryam/Maryam. As you can see, one name is written in several variants.

In addition to the Linguo-poems about the onims, information about the history of their origin and the motivation of creation will certainly be of interest to

anyone. At the same time, the Institute has prepared the following cultural and educational resources of onim.

In the process of developing the KMAT linguistic module, all these norms and video norms are taken as a basis. This is because the writer may not be able to determine which of these options is the norm. So writes in one of the variants. In the process of automatic text recognition, the automaton must recognize all variants of onim types. Therefore, both this norm and the video form were given in parallel.

Automatic recognition of onims in the text we simplify the ways of structuring information, understanding content, information retrieval, data enrichment, semantic analysis. We increase the efficiency of language models and algorithms by recognizing onims. Automated onim recognition processes save human resources and speed up data processing. Proper name recognition provides important information for Social Research, marketing, trend tracking, and other analytical work.

The reasons mentioned in this text highlight the importance of automatic recognition of onims, the work we are doing is the first steps on this path.

In conclusion, today it is very important for future generations to recognize the motivation, geographical location, folk knowledge of proper names in the Kazakh language. We believe that it is the task of scientists-correspondents to provide books in a convenient format, easy to use by the population on modern information tools, and make them available at any time.

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康德：美学与先验整合

I.KANT: AESTHETICS AND TRANSCENDENTAL INTEGRATION

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摘要。康德美学不仅在伊曼纽尔·康德的先验哲学（理论哲学和实践哲学）的整合中发挥了重要作用，而且在对与人类目的相关的整体综合理想的哲学描述中也发挥了重要作用；这一理念预设了某种“理性的完美系统统一”的美学状态。这种整合的标志是两个概念：先验人类学概念和哲学的世界概念。这种精神形态的塑造有助于形成新的思想，完成一种整体人文主义方法的发展，这种方法理解我们所有人共同的世界，没有分水岭、边界和区域空间的划分，就美学而言，其主题就像交响乐团的演奏，其中包括全人类的代表作为音乐家。世界概念映射了普遍性，同时保留了个人的笔迹。这张地图概括和联系，保持了普遍、特殊和个体的和谐——不仅是“彻底发展的人类学”的主题，而且是与智慧相关的形而上学的主题，理解“人类的必要和基本目标”，并有助于科学以其综合重点的勇敢和富有成果的发展“不会偏离主要目标——普遍的幸福”，即所有人的幸福。而这一形而上学任务在康德看来，具有明显的美学内容，与形而上学“最崇高的问题的解决”有关。而这一任务本身只有一个综合的解决方案。康德的美学可以称为批判哲学活动原则的整体美学。在其中，创建了一个整合点的美学邻域。

关键词：康德，哲学，美学，整合，世界概念，人性。

Abstract. Kant's aesthetics plays a crucial role not only in the integration of parts of Immanuel Kant's transcendental philosophy - theoretical and practical philosophy, but also in the philosophical depiction of the integral synthetic ideal associated with the purpose of man; this idea presupposes a certain aesthetic state of "perfect systematic unity of reason". The symbol of such integration is two concepts: the concept of transcendental anthropology and the world concept of philosophy. The molding of this mental form contributes to the formation of new ideas, completing the development of a holistic humanistic approach to understanding the world common to all of us without watersheds, borders and division into regional spaces, the theme of which, as far as aesthetics is concerned, sounds in the performance of a symphony orchestra, which includes representatives of all mankind as musicians. The world concept maps the universal, while preserving the handwriting of the individual. This map summarizes and

connects, maintains the harmony of the universal, the particular and the individual – as a subject not only of “thoroughly developed anthropology”, but also of metaphysics connected with wisdom, comprehending “the necessary and essential goals of humanity” and contributing to the fact that the courageous and fruitful development of science with its integrative focus “is not distracted from the main goal – from universal bliss”, the bliss of all people. And this metaphysical task has, in Kant’s view, a clearly aesthetic content, connected with the “resolution of the most sublime problems” of metaphysics. And this task itself has only an integrative solution. Kant’s aesthetics can be called integral aesthetics as a principle of activity of critical philosophy. In it, an aesthetic neighborhood of the integration point is created.

Keywords: *Kant, philosophy, aesthetics, integration, world concept, humanity.*

Kant’s aesthetics plays a crucial role not only in the integration of parts of Immanuel Kant’s transcendental philosophy - theoretical and practical philosophy, but also in the philosophical depiction of the integral synthetic ideal associated with the purpose of man, whose rational self-control allows him to be called a philosopher by analogy; this idea presupposes a certain aesthetic state of “perfect systematic unity of reason”. The symbol of such integration are two concepts: the concept of transcendental anthropology, which, as the famous Russian Kant scholar V. V. Vasiliev suggests, is composed of the postulates of the three “Critiques”, analyzed from the point of view of the ultimate goal of human existence, and the world concept of philosophy introduced by Kant in the “Critique of Pure Reason”. The world concept “has always been the basis of the term philosophy, especially when this concept, so to speak, was personified and presented as if in the ideal of a philosopher as a model. In this sense, philosophy is the science of the relation of all knowledge to the essential goals of human reason” [2, p. 1051 (AA III, B 867)]. Transcendental anthropology and the world concept, transcendental knowledge of the world form the structure of Kant’s integrative thinking. If the concept of transcendental anthropology points to a project aimed at forming the Kantian system as a metaphysical fulfillment of human capacity, then the world concept of philosophy, which best demonstrates how it is possible as the legislation of human reason; in such an interpretation, the philosopher himself appears as a teacher-moralist, “guiding all” virtuosos of reason (both scientific and humanitarian). This means that philosophy is a necessary factor in the integration of scientific knowledge of the world, aimed at solving civilizational problems. The world concept establishes a correspondence between knowledge of the world, cognitive theories and the theory of reason, its civilizational culture; this is the theory of reason as a property of homo sapiens, who carries the world within himself as a significant meaning. The world concept is a cast of attitudes towards everything that in life in-

evitably occupies and captures everyone who enters the orbit of thinking and stays in it, contributing to the understanding of philosophy itself as a nomography of the human mind, a rethinking of views on its nature. In this case, the fundamental mission of reason itself is fulfilled. The molding of this thought form contributes to the formation of new ideas, completing the development of a holistic humanistic approach to understanding the world that is common to all of us, without divides, borders, or divisions into regional spaces, the theme of which, as far as aesthetics is concerned, is performed by a symphony orchestra, whose musicians include representatives of all of humanity. Such an understanding serves for the multifaceted display of the ontologies (ontology alignment) of thinking, for clarifying the meaning of philosophical creativity, a project of world integration capable of laying out routes within what Edmund Husserl would call the life-world. When speaking about this route, one should avoid philosophers arbitrarily drawing a plan, which would lead to the fact that “they stopped in ignorance about the path they should take and constantly argued among themselves about the discoveries that each sought to make on his own path” [2, p. 1057 (AA III, B 872)]. At the same time, we are talking about integration as a universal interdisciplinary synthesis of all components of Kantian criticism (theoretical philosophy, aesthetics and ethics) as a complex intellectual phenomenon. Academician A. V. Smirnov gives an insightful interpretation of Kant’s philosophy; in his letter to me dated October 12, 2024, he emphasizes: “The more I read Kant, not least in connection with his [300th] anniversary, the more I find myself a Kantian, and the more I find, the more I want to rewrite his immortal creations. It’s strange, really. When you start to think about it, it turns out that Kant created such ingenious “basements”, as Vasiliev put it, of his metaphysics that too many paths diverge from any question, and he seems to leave the opportunity to follow them all. His unambiguity turns into his ambiguity. In 300 years, of course, we have learned a lot of new things that Kant could not have known, and we can look at his entire system differently; but he seemed to have foreseen this otherness, even without knowing about its possibility! “ Too many metaphysical paths diverge from Kant’s question of the aesthetic, which is worked out mainly in the “Critique of the Power of Judgment” (1790). It is of essential importance for understanding the entire composition of Kant’s transcendentalism, its integral intentions.

Aesthetics is immersed in the deep structures of Kant’s transcendentalism. For the first time in the history of thought, a German philosopher reveals the specificity of the aesthetic attitude to the world that encompasses us, explores the methods of conceptual controversy between the concepts of the beautiful and the sublime, creates a sculptural image of the aesthetic facet of transcendental anthropology and a new metaphysics of the nature of art. If we follow his principles, the term aesthetics can be considered as “intended exclusively for the predicate related in

cognitive judgments to contemplation” [3, p. 945 (6, p. 61)], although it has not only a purely epistemological status, since it addresses the broader problematic of worldview and human knowledge. This philosophical discipline is explicitly or implicitly presented as a manifestation of the eidetic features of reason with its laws of freedom, different from the laws of nature given by the intellect. But since the intellect prescribes laws to nature – this object of possible experience, then it is in fact “the source of the general order of nature” as an object of possible experience, and the idea of such an order just gives rise to an aesthetic state in the soul, associated with admiration for it. Before us is a synthesis of aesthetic identification, when the creative, created by the temporality of the ego (and therefore all aesthetics is, in fact, the keyboard of time) reveals itself as possessing a semantic world with all its art, aesthetics, culture, metaphysics of the harmony of monads, with the status of the creation of the created (generative artificial intelligence, which can be characterized using the Kantian terms of an ingenious machine and automatic spontaneity: but it is still difficult to apply to it the Kantian concept of a being created by reason; perhaps art itself is the first artificial intelligence), freely varying itself in the transition from one to the other - all this is formed in the course of the analysis of the aesthetic meanings of the basic structures of Kantian transcendentalism, the original aesthetic intuitions of criticism, the synthesis of the apprehension of the imagination (this ability to create images or to carry out what in the modern context is considered as the features of the revolution of the image), its integration into the structures of reading memories, experiences, into thematization, for example, “the predominant affect in the play” [5 (AA V, 329)]. These integrative works open up the prospect of understanding the bases of intentional changes and the bases of creative perceptions, which also include continuously changing mediated perceptions, which are the consciousness of light, color and sound. Kant’s scheme of productive imagination has the ability to depict, create, “anticipate experience”. The philosopher makes discursive judgments about the connection of aesthetic ideas, theses of taste, reveals the systemic integration of higher cognitive abilities. The critique of taste itself “fills the gap in the system of our cognitive abilities, opens up amazing and, it seems to me, promising views on the complete system of all the faculties of the soul, since they are related in their definition not only to the sensory but also to the supersensory, without leading to the need to move the boundary posts established by strict criticism for their final use” [3, p. 939 (6, S. 58)]. Synthetic objects of aesthetics, apprehension aesthetica, comprehension aesthetica (aesthetic understanding) integrate “the diverse into a holistic representation, and thus the latter receives a certain form” [1, p. 247] of the embodiment of the world that is aesthetically significant for the subject, that is, a specific way of considering aesthetic thinking – after all, we understand the world given in experience, according to the scheme of what we ourselves are ca-

pable of creating, realizing the ideal of aesthetic realization in the world of each, in the world of monads with windows for social connections. Today, the very leading idea of constructing such worlds has as its premise that renaissance which will once again awaken genuine aesthetic meditations: the focus of attention here is the symmetry of new perceptions that flow, the immanent harmony of understanding, the horizons of representations and joint action, the creative registers of pre-subjectivity, the aesthetics of what is “created by life” (G. Shpet), openness to the event of art, that is, something by means of which man overcomes his nature, and society improves its culture, reflection on how art writes the text of spiritual unity, the tension of the transition from artistic experiment to the experience of art, making aesthetic preparations for the ascent to humanity, the aesthetic unfolding of the first-person perspective, a method that draws from aesthetic intuition.

Artistic achievement and discovery, the discovery of talent, productive aesthetic imagination, reflection on art - all of them are connected with probabilistic knowledge, which, according to Kant, is such when there are more cases determining the object than cases determining its opposite, and he attributes the art of measuring probability to mathematics. Moreover, the ability to judge extends to the philosophical study of probability. Such a phenomenology of knowledge, in which hesitation is similar to the meaning of Kant's *als ob*, as if connecting and not connecting sensuality and reason, is extremely important for understanding the meaning of aesthetic research, which, after all, also experiences certain hesitations between the theoretical and the moral, the theoretical judgment of existence and the practical judgment of what should be, representing a kind of middle link between them, possessing a kind of “middle method” (Kant). Of course, we are not talking about what was characterized in Russian literature as “fluctuations of minds” (A. S. Griboyedov), because Kant's understanding of transcendental fluctuations is philosophically significant insofar as they are a kind of aesthetic metronome with the scope of its fluctuations, they “write” the law of the aesthetic measure of the entire metaphysical system – a measure that supports the sense of rhythm when creating its parts, and are also an exact guide to the tempo (Italian tempo from Latin *tempus* - time, German - *Zeitmaß*) when performing thought processes during the “rehearsal” of philosophical activity. In essence, they tune the entire metaphysics, turning it into temporal metaphysics. Thus, the aesthetic neighborhood of the integration point is created. The aesthetic openness of philosophical efforts does not take the form of embellishment of thought, but, firstly, the cultivation of the skill necessary for a person to philosophize, secondly, the world concept of art resulting from aesthetic analysis, thirdly, personification, which is in the spectrum of views covered by philosophy, here the “boundaries of the ideas we have created are established; from these ideas all original thinking proceeds [*hervorgeht*]” [1, p. 566], such acts of cognition are performed, which Kant calls prototypes or ideas, which

are structures of the original intellect. Theoretical and practical philosophy can be integrated into transcendental philosophy, but they cannot be mixed, much less eliminate the problem of the aesthetic transition between these areas. Aesthetics is a way of harmonious unification between them. It can be called integral aesthetics as a principle of activity of critical philosophy. Aesthetics itself should be thought of as a way of interaction between theoretical and moral philosophy, and in this sense it contains a metaphor or personification of the moral law in us. Here human morality “as an ideal (to which one must constantly approach) is usually personified poetically under the name of a sage” [4, p. 33 (383)].

An ensemble of mental things does not yet mean their integrity, that is, the distributive or collective, logical or real unity presented by the philosopher. That is, another level of their unity and integration is assumed. Kant uses the concept of a new type of observer - the integrative figure of the cosmos viewer, he can “himself a priori create elements of knowledge of the world, from which he crafts in an idea a picture of the world as simultaneously its inhabitant” [1, p. 548].

The world concept maps the universal, while preserving the signature of the individual. This map summarizes and unites, maintains the harmony of the universal, the particular and the individual – as a subject not only of “thoroughly developed anthropology”, but also of metaphysics connected with wisdom, comprehending “the necessary and essential goals of humanity” and contributing to the fact that the courageous and fruitful development of science with its integrative focus “is not distracted from the main goal – from universal bliss” [2, p. 1065 (AA III, B 879-880)], the bliss of all people. And this metaphysical task has, in Kant’s view, a clearly aesthetic content, connected with “the resolution of the most sublime problems” of metaphysics. And, as we can see, this task itself has only an integrative solution. Kant’s integrative philosophy is one of the prerequisites for the integral humanism of J. Maritain.

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哲学论述中真理的多面性

THE MULTIFACETED NATURE OF TRUTH IN PHILOSOPHICAL DISCOURSE

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The fox knew many truths, but the hedgehog was wise:
he knew one, but great truth
Archilochus

注释。本文探讨了使对真理的明确理解变得复杂的原因，其中主要原因是真理的多面性（多义性）。本文给出了这种多功能性的各种表现形式，这些表现形式是多功能性所固有的，它补充了整体论风格中对各种复杂性的传统解释。

关键词：真理、多功能性、方面、视角、整体、整体、完整、知识、信仰。

Annotation. *The article examines the reasons that complicate an unambiguous understanding of truth, the main one being its multifaceted (polysemantic) nature. Various manifestations of such versatility are given, inherent in versatility, which complements the traditional interpretation of various types of complexity in the style of holism.*

Keywords: *truth, versatility, aspect, perspective, whole, integral, complete, knowledge, faith.*

The problem of understanding the meaning of truth and its role in the process of cognition is one of the central epistemological problems that have attracted the attention of philosophers since ancient times. Having arisen in the period of antiquity, the classical theory of truth became dominant in the theory of knowledge. In his concept of knowledge, Plato first developed the idea of absolute truth - the epistemological ideal, which is the goal of any cognition. Meanwhile, in the matter of understanding its meaning, features and role, many uncertainties remain, which is not least caused by the various manifestations of its complexity.

The fact is that when considering truth as an independent cognitive object and as a concept, it can be noted that it is indivisible and integral. Its complexity is

caused by its non-composition, multi-particle nature, the presence of fragments, components of various types, which presupposes its a priori division into parts (it is known that there is no half or one tenth of the truth), which is characteristic of the holo-partitive approach when considering integral objects (the paradigm of holism). It represents another type of whole – integrity, the complexity of which is manifested in its versatility, multifacetedness, and diversity. This feature of integral objects is analyzed within the framework of the configuration approach (see, for example, [1]), which serves as the rational core of the paradigm of versatility.¹ The application of this approach is demonstrated using the example of a multi-faceted consideration of such a complex ideal object as philosophy, which, however, did not exclude its holo-partitive analysis [2]). The essence of the approach comes down to the construction of a specific mental construction of the “daisy” type around a whole object, which specially organizes various angles, aspects, plans, approaches, oriented toward the corresponding appearances of the object and highlighting the particular images visible in them.

Among the various manifestations of versatility inherent in truth and complicating its lapidary, constructive understanding, we will note only a few of them.

The multi-perspective nature of truth

Here, the perspective is understood as one of two mutually opposite points of view, oriented toward a separate facet of the contradiction underlying the object under consideration, in this case, truth. Protagoras was the first to declare that any object can be spoken of in two ways and in opposite ways. And in general, the sophists, of whom he was a prominent representative, believed that all things can be looked at from opposite sides, and that there is no final truth.

Let us give examples of just a few pairs of perspectives that allow us to reveal the internal contradictions of truth.

Firstly, it is a mutually complementary and mutually contradictory synthesis of faith and knowledge, which have traditionally been opposed to each other. However, this is not entirely true. Knowledge is considered true only if we trust it. In other words, truth has two aspects: it acts both as a consequence of knowledge and as a result of belief (trust). Moreover, their relationship is not of the logical addition “either – or”, but of the logical multiplication “and – and”. The first relationship, dominant in Aristotelian (formal) logic, demonstrates a situation of mutual exclusion, for example, when they speak of either divine or human truth. The second relationship is more characteristic of dialectical logic, which is becoming increasingly widespread. It is this logic that assumes a two-perspective “mutually dissolved” knowledge and faith, following the example of the ancient Chinese symbols “Yin and Yang”. In other words, truth is inherent in both faith and knowledge, which allows us to speak, in particular, of “true faith” and “true knowledge”.

¹ From the English versatility – versatilitiy.

Secondly, the situation is similar with the unity of feeling and reason, which should not contradict each other in establishing the truth. Thus, Sextus Empiricus pointed out that the Stoics recognized as true only a certain part of the sensed and thought. At the same time, the sensed is not true directly, but only through its relation to the thoughts corresponding to it: truth is the product of a person's intellectual analysis of his perceptions.

Thirdly, there is the concept of corpuscular-wave dualism in the world of elementary particles, which states that each particle is simultaneously both a corpuscle and a wave. This example continues the series of numerous phenomena of the internal contradiction of truth.

The multifaceted nature of truth

An aspect, as opposed to a perspective, is simply one of the various points of view on an object, representing it as a whole, as if from a separate side. The most important manifestation of the multi-aspect nature of truth is the presence of various definitions. Thus, to the question: "What is truth?" various, often mutually exclusive answers are given: truth is the essence of an object, truth is the origin of all that exists, truth is the goal and result of knowledge, etc. Moreover, such a variety of definitions is caused not so much by the subjectivity of the authors, as by the objective versatility of truth.

The main reason leading to such multidefinition of truth is the multiplicity of points of view on it from the various teachings and directions of theoretical thought operating with it. Thus, being multifaceted, truth is considered from the point of view of religion, philosophy, logic, science, axiology, sociology, each of which highlights specific shades of its meaning, forming a one-sided concept of truth. Indeed, for example, in religion truth is God's revelation, in philosophy truth is the correspondence of a concept to an object of thought, in logic truth is a statement opposite to a lie, in science it is an adequate reflection of an object by a knowing subject, in axiology truth is a value, etc. Moreover, even within the framework of each such direction there is a noticeable diversity of its interpretations. Their multiplicity is demonstrated, in particular, by the history of philosophy. The context of its use is also important.

The polymorphic nature of truth

The third reason for the versatility of truth is the existence of its various forms (types). Thus, it is believed that truths can be absolute and relative, conditional and unconditional, objective and subjective, concrete and abstract, innate and acquired. In addition, artistic, moral, authoritarian and even "colored" truths are distinguished, which also act as different faces of a single archetype of truth in general, truth as a generic concept. According to the sphere of application, truths of various plans are distinguished: religious and philosophical, scientific and every day. Aristotle, for example, distinguished between the apodictic and dialectical (in

this case, probabilistic, allowing for an opposite representation) nature of truth. Such polymorphism also complicates the understanding of truth as a fundamental cognitive category.

The multi-qualitative nature of truth

The fourth reason for the versatility of truth was the multiplicity of its characteristics (qualities, properties, attributes, features, etc.). Thus, its validity, consistency, verifiability, provability, value, etc. are distinguished. In various contexts, the concept of truth was given different meanings by default: true as something absolute, infallible, unconditional, indisputable, divine, correct, real, genuine, truthful, righteous, irrefutable, infallible, self-evident, fair, etc. Rather, these are characteristics not so much of any truth in general as of its absolute variety. Each such feature characterizes absolute truth from a separate side and gives reason for its multifaceted consideration.

The multiplicity of absolute truths characterizing a separate object also contributes to the confusion of understanding truth. Ancient philosophers, for example, believed that several different true judgments can be made about each object. Moreover, it was implied that with the deepening of knowledge about the subject, new truths about it were discovered. For example, one can say that Socrates was a Greek - and this will be true, that he was a man - also true, that he was a philosopher - undoubtedly, etc. In this case, the multi-truth is caused by the multi-status of the object, which is another type of its versatility.

The multi-criterial nature of truth

The fifth reason for the multifaceted nature of truth is the multiplicity of criteria for its evaluation. The following types can be distinguished.

Firstly, the role of criteria for the truth of knowledge is played by the above characteristics of truth that true knowledge must possess.

Secondly, such criteria may include: authority of the source of knowledge; conformity of knowledge to the laws of logic, conformity to previously acquired knowledge recognized as true; agreement among specialists in a given field; general significance, i.e., recognition of knowledge as true by many people; simplicity, clarity of presentation of thought; absence of contradiction in the idea of the subject of knowledge, etc.

Thirdly, as the main criterion of truth of knowledge, they point to practice, which presupposes verification of knowledge by experience, as a result of observation or in practical life. It is not for nothing that they say: "Practice is the criterion of truth."

The multidimensional nature of truth

Another reason for the versatility of truth is its multidimensionality. Thus, Aristotle distinguished four successive stages of truth: experience (empeiria), art (techne), knowledge (episteme) and wisdom (sophia), which can be understood

as planes (levels) of everyday, creative-active, scientific-cognitive and philosophical-metaphysical comprehension of truth. On the other hand, according to the importance and complexity of the phenomena considered within the framework of each of them, we can speak of truths of the first, second, third and fourth order.

It seems legitimate to use also the religious, philosophical, scientific and everyday planes (sections of existence) of truth. Mixing such planes often leads to incorrect understanding of what interpretation of truth is being discussed in each individual case. The situation is aggravated by the fact that even in individual planes, truth continues to have a multifaceted character.

The multifaceted nature of religious truth. Truth was perceived differently in different historical periods. Thus, in the Middle Ages, truth was understood in a completely different sense than the ancient Greeks understood it. On the one hand, it was no longer an adequate representation of reality. There was no need to search for it. Truth had already been revealed in the Holy Scriptures and in the works of theological authorities, so the task of theosophists, theologians and religious philosophers was to study and comment on this truth. Nevertheless, Thomas Aquinas put forward the principle according to which the truths of science and the truths of faith cannot contradict each other; there must be harmony between them. He also put forward the idea of the truth of knowledge obtained by reason only if reason corresponds to faith. On the other hand, in different national religions there were specific approaches to understanding truth, its varieties were distinguished. As many religious movements existed, so many different truths were professed by them. At the same time, each individual religion considered itself the only true one, which led to continuous conflicts and heated debates.

The multifaceted nature of philosophical truth As for philosophical truth, one can cite various opinions of ancient and medieval thinkers on this matter.

According to Socrates, only that knowledge is true which can be applied in practice, and the only way of philosophical work can only be personal piety.

The Sophists were convinced of the absence of objective truth outside of man and believed that everyone has the right to accept as truth what is suitable for an individual in a particular case, depending on personal inclinations, situation, benefit, etc. In the question of the truth of a particular position, the subjective opinion and arbitrariness of a person as the “measure of all things” became decisive, therefore there are no unambiguous answers to complex questions.

Plato and Aristotle believed that truth is a thought that corresponds to objective (independent of the knowing subject) reality.

In the era of theocentrism, medieval philosophy did not completely part with the ideas of Divine truth. Although Boethius of Dacia already held the opinion that philosophy should follow arguments, even if they contradict religious faith. And Thomas Aquinas believed that truth, established in the process of cognition

through reason and experience, is the “correspondence of intellect and thing.” The main sources of truth of various judgments in philosophy, which does not have its own empirical basis, are the opinion of authorities and the logic of evidence, which are verified through contemplation of reality. The question of truth was also devoted to the works of many other philosophers of the Middle Ages, in which a multifaceted view of truth is formed. This position is developed in more detail in [3].

The criterion of the truth of philosophical knowledge is its correspondence to reality. For philosophy, truth serves as the goal and result of understanding the World.

The multifaceted nature of scientific truth. In scientific terms, truth is adequate knowledge about some object, obtained through a two-sided - sensory and rational study of it. It is the goal and result of knowledge of nature, man and society. It is also multifaceted. Thus, Pitirim Sorokin believed that there are three types of scientific truth: sensory-empirical, scientific-rational and intuitive. Each of them is only a partial truth, the complete truth will consist in their integration into the whole. He called one article, which set his scientific credo, “My philosophy is integramum.”

Situations with the relativity of scientific truth arise especially often, caused by the obsolescence of previous ideas and the emergence of new ones to replace them. Canonical examples are the long-standing misconceptions with the world systems of Ptolemy and Copernicus or with the excavation of Troy by Henry Schliemann. Many collisions arose, for example, in physics at the end of the 19th and beginning of the 20th centuries. Thus, for a long time they could not determine which model of light is true - beam, corpuscular or wave, until they realized that these are simply three facets of a single entity. Niels Bohr put forward the principle of complementarity, according to which there are two different, but mutually complementary ways of describing physical reality - spatio-temporal and pulse-energy.

The criteria for the truth of scientific knowledge are its reliability, verifiability, reproducibility, adequacy, evidence, and argumentability, reflecting its multifaceted nature.

The multifaceted nature of everyday truth. Everyday truth sometimes takes on the character of truth. Moreover, there is a gradation of truth (truthfulness): absolute falsity, doubtfulness, admissibility, plausibility, conditional truthfulness, absolute truth. Of course, only true knowledge can be considered knowledge, discarding such thought forms of consciousness as: lie, delusion, mistake, fiction, utopia, fantasy, delirium, illusion, hallucination, mirage, disinformation, gossip, etc., which are not recognized as true a priori. But in everyday life they are encountered all the time. And what to do with political, religious, social myths?

What to do with history, which has many versions of the past, a variety of its virtual plans (variability of retrospective)? It is no coincidence that Karl Popper noted that history has exactly as much “meaning” as we put into it. In other words, we often see not what is actually there, but what we want to see. It is difficult to combine objectivity and political correctness or to consider works of art to be factually true, not to mention fantasy, mythology, folklore, where the main idea, the moral, is given in hints, allegories. This morality contains an implicit truth, allowing for variability in its interpretation. Everyone understands it in their own way, and some do not notice it at all. And all this knowledge has varying degrees of truth.

In connection with the above, the question arises whether it is possible to apply the criterion of truth to everyday knowledge? Therefore, more often than not, they resort not to truth, but to veracity, which replaces truth when communicating with other people. Truth in everyday life is most often common sense, instructions learned in early childhood, everyday habit. In everyday consciousness, what is considered true is what we believe in, what we are accustomed to, what we trust. And in this sense, everyday truth is close to religious truth, in which the role of the perspective of faith is great.

Thus, the versatility of truth, which complicates its use in various spheres of public consciousness, manifests itself in the following forms. Firstly, in the internal contradiction of truth as an ideal object, in the presence of its inherent alternative and mutually complementary facets (angles). Secondly, in the presence of a multitude of its representations in the views of individual authors and entire trends in public thought. Thirdly, in polymorphism, the diversity of its forms of manifestation. Fourthly, in the multiplicity of its characteristics and qualities, allowing us to consider truth from the appropriate sides. Fifthly, in the multitude of criteria for assessing the reliability and truth of knowledge. Sixthly, in the multifaceted nature of its existence in various forms of public consciousness.

At the same time, in modern times, interest in truth in general, and in everyday truth in particular, has begun to fade. The former pathos, attributed, according to some authors, to Plato: “Socrates is my friend, but truth is dearer,” and, according to others, to Aristotle: “Plato is my friend, but truth is dearer,” is no longer there. This is not least due to the gradual erosion of the institution of truth. This is especially noticeable in the political sphere, which is largely facilitated by numerous media outlets. Other ideas about the forms of manifestation of the versatility of truths are also emerging. A.P. Nazaretyan, for example, believed that the concept of truth should be left to the clergy, and that scientists should better use the concept of a model [4].

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后世俗现实与新形式的宗教认同
POST-SECULAR REALITY AND NEW FORMS OF RELIGIOUS
IDENTITY

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摘要。本文追溯了世俗化理论在宗教社会学中的历史演变。从马克思、涂尔干和韦伯的古典观点开始，本文探讨了宗教最初如何被视为与现代化不相容，以及世俗化如何被视为社会进步的必然结果。几十年来，彼得·伯格和托马斯·卢克曼等思想家对这种线性叙述提出了挑战，他们认为宗教适应了现代和后现代背景，而不是消失了。本文探讨了世俗化的关键维度——包括分化、私有化和多元化——并强调了多重现代性在解释宗教与现代化之间的各种关系方面的重要性。与早先的预测相反，宗教继续发挥着重要的社会作用，尽管它经常采取与当代文化、技术和政治条件相一致的新形式。

关键词：世俗化理论；现代化；宗教社会学；宗教与社会。

Abstract. *This article traces the historical evolution of secularization theory within the sociology of religion. Beginning with classical perspectives from Marx, Durkheim, and Weber, it examines how religion was initially viewed as incompatible with modernization and how secularization was considered an inevitable outcome of societal progress. Over the decades, thinkers such as Peter Berger and Thomas Luckmann have challenged this linear narrative, arguing that religion adapts to modern and postmodern contexts rather than disappearing. The text explores key dimensions of secularization—including differentiation, privatization, and pluralization—and highlights the significance of multiple modernities in explaining the varied relationships between religion and modernization. Contrary to earlier predictions, religion continues to occupy a socially significant role, although it often takes on novel forms that align with contemporary cultural, technological, and political conditions.*

Keywords: *secularization theory; modernization; sociology of religion; religion and society.*

Researchers remain interested in how society and religion interact. Contrary to earlier predictions, religion has not disappeared and has not lost its social

significance. Social transformations have resulted in a new type of society, often referred to as modern. The concept of “secularization” has been known since 1648 in its legal sense, referring to the confiscation of church lands; by the 19th century, it evolved into a general concept describing the process of liberation from the influence of religion. This act of confiscation explains the negative connotation associated with the term. In the 20th century, theorists of secularization argued that religion was losing its significance, viewing it as incompatible with progress. Max Weber transformed the notion of “secularization” into a neutral scholarly category.

French Enlightenment thinkers regarded religion as a prejudice incompatible with reason, seeking to structure society exclusively on rational grounds. The Enlightenment era thus contributed to the idea that religion would eventually disappear. The initial outline of secularization theory included the discrediting of religion, the exaltation of reason, and the promotion of progress. K. Marx advanced this outline into a more comprehensive theory¹. He believed that one could predict the consequences of progress because history itself was a form of evolution—and that religion, therefore, was incompatible with it. According to K. Marx, secularization depends on economic factors. E. Durkheim saw progress as stemming from material causes, identified through reason. His evolutionary model likewise served as a model of secularization. E. Durkheim contended that members of society experience unity through religious actions and that society’s functioning requires religion or some quasi-religious substitute. M. Weber further argued that religious worldviews shape economic ethics, identifying “religious conditioning of life behavior”² as a key determinant. He believed that the modern, rationalized world follows a new logic of development where religion is unnecessary—a process he described as secularization.

These authors shared a common view of societal development: transitioning from an “enchanted” individual and a society steeped in prejudice to a “disenchanted” and rational one. The indisputable thesis regarding the ‘disenchantment’ of the world dominated the social sciences until recently, shaping their main orientations and methodologies³. However, this thesis now faces criticism. Critics argue that there is neither a truly disenchanted world nor a secular space that persists once religion is removed. Historically, rather than dividing reality into religious and non-religious (secular) domains, societies inhabited a unified sphere. For the modern era, the category of “secular” remains significant, and it is closely tied to the notion of secularization. The root meaning of the secular, as some scholars note, is in *saeculo*, referring to existence in this world and in this time⁴. Every culture contains some opposition between the sacred and the profane, and religion mediates between these two. The secular, by contrast, is neither sacred nor profane. In (post-)Latin Christian culture, the concept of the secular has lost its

dichotomy⁵. Consequently, the sacred and the secular become opposites, while the secular and the profane overlap. Thus, the term “secular” denotes a dimension of reality that lies between the sacred and the profane.

In the 1960s, secularization and its relationship with modernity emerged as significant sociological issues. The mid-twentieth century was a period of far-reaching social transformations, prompting the need for theories to explain such changes. These transformations involved scientific and technological progress, cultural revolutions, industrialization, and urbanization. The theory of secularization became a subsection of modernization theory during this time. The 1960s also saw a new generation of sociologists of religion investigating the influence of modernization on religious life. A key development was the notion of a single trajectory for the evolution of modern societies, termed the theory of religious evolution. During this decade, “secularization” began to be employed in multiple, non-contradictory senses, including desacralization, differentiation, and transformation. Differentiation segregates religion into a distinct institution, causing it to lose its educational, socializing, and judicial functions. As society grows more complex, new values emerge. Discrepancies among various religions were expected to result in the privatization of their religious components. Meanwhile, the rise of ecumenism further weakened confessional boundaries. Peter Berger identified the main processes associated with secularization as the bureaucratization of church institutions—thereby transforming them into competitive organizations—and the professionalization of the priesthood, viewing it increasingly as a form of professional occupation. Such processes, he argued, inevitably affect secularization. Indeed, the expectation was that secularization would ultimately diminish individual religiosity. For P. Berger, the driving forces of modernization lie in the economy, technological production, and bureaucracy⁶. He shared the thesis that modernization leads to secularization. Certain aspects of the Judeo-Christian tradition contributed to modernization: the principle of God’s radical transcendence, the linearity of history, the radical rationalization of the world, and the emergence of the church as a social institution. The economy, shaped by capitalist and industrial processes, underpins modernization and secularization by moving away from the control of religious norms.

Religion no longer constructs a shared world; its reality now consists of incompatible “universes of meanings.” Not only do different traditions coexist, but people also inhabit diverse life-worlds. Individuals are bound by divergent spheres of meaning and action—exemplified by the dichotomy between private and public life. Moving between these spheres becomes necessary, thus negating the absoluteness of any single world. As a result, religion undergoes privatization, withdrawing from the public realm into the private sphere. Pluralization leads to a relativization of meanings: nothing seems self-evident anymore, including re-

ligious tradition, which each person now adopts by choice. For a religion that has turned into one of many societal institutions, there is increasingly little space left in public life. In this context, the “heretical imperative” complicates the very possibility of faith.

Pluralization gives rise to frustration and a sense of “cosmic homelessness,” which is not compensated for by the benefits of civilization. The difficulties of existence drive demodernization, which is seen as necessary to overcome alienation, loneliness, and uncertainty. Peter Berger’s awareness of these opposing forces of modernization led him to conclude that neither modernization nor secularization is irreversible. He later abandoned secularization theory, and in 1999 asserted that the assumption that we live in a secularized world is erroneous⁷. Modernization, according to Max Weber, brings about what he called the “polytheism of values.” Pluralism replaces a unified religious system of values. Weber’s concept of value polytheism encompasses the existence and recognition of multiple value systems. It presupposes that various value orientations, beliefs, and assessment systems can coexist, each with its own principles, norms, ideals, and objectives. This perspective acknowledges the diversity and pluralism of values and rejects the notion of a single truth or universal set of values. Weber identifies several characteristics of value polytheism: instead of the Christian God, other “gods” emerge, representing abstract values. These “new gods” conflict with each other, forcing individuals who wish to live by certain values to take sides. Choosing one “god” is a momentous decision; when one says “yes” to one god, one simultaneously says “no” to the others⁸.

According to Peter Berger, humanity constructs the cultural world, which is produced and reproduced by human beings. Society is likewise maintained through collective human effort. Religion is a human project within which a sacred cosmos is established, or, in other words, “cosmization in a sacred mode”⁹. The sacred cosmos constitutes a different reality that imbues life with meaning. Its opposite is chaos, out of which this sacred cosmos emerges. By ordering reality and shielding individuals from anomie, the sacred cosmos helps people avoid the perils of chaos, proper relations with the sacred cosmos ensure protection from the threats of chaos, and falling out of these relations means lapsing into meaninglessness. Religion, therefore, sustains a link with the sacred and counters chaos; this is the central aim of efforts to construct order. Secular approaches to cosmization, which became characteristic of the modern era, are best exemplified by science, but cosmization itself was originally sacred in nature. Through the sacred, humanity acquired the capacity to create a cosmos, with religion playing a pivotal role in shaping our understanding of the world.

For T. Luckmann¹⁰, religion is not merely an institution; rather, the socialization process itself, through which a person acquires a worldview, can be seen as

a religious process. Luckmann identifies two main processes of modernity that foster secularization: differentiation and pluralism. These are linked to the development of specialized institutions and the absence of a unified worldview. Differentiation gave rise to autonomous institutions and the division of private and public spheres. Consequently, religious consciousness in individuals is marked by unpredictability, bricolage, and the layering of diverse content.

During the 1970s, the decline of religion appeared self-evident, yet by the 1980s it became clear that religion was not disappearing, and the theory of secularization came under criticism. This critique was fueled by the emergence of new forms of religion, the phenomenon of “new religious movements,” empirical findings, and the persistence of personal religiosity. Assertions of the theory’s universality and its tight linkage with modernization were subsequently discarded. J. Casanova¹¹ concludes that religion continues to hold social significance; a process of deprivatization is taking place, prompting a reevaluation of the notion that religion has been relegated strictly to the private realm. He distinguishes several aspects of secularization: differentiation; the decline of religious beliefs and practices; and the marginalization of religion through its confinement to private life. However, social differentiation itself is now encountering growing skepticism.

During the 1990s, proponents of the revised theory critiqued privatization, overgeneralization, and relativization, while reinforcing the concept of differentiation. They rejected the thesis of declining religion and religiosity, recasting secularization instead as a process of structural change. A new paradigm, rational choice theory, took shape, positing that people increasingly define themselves through sociological rather than theological or religious lenses. Rational choice theory assumes that individuals make rational decisions based on preferences, available information, and expectations about the outcomes of their actions, secularization theory served as a subtheory to explain religious social transformations in the context of modernization. Religion was viewed as an impediment to modernization, while secularism was proclaimed one of the key features of modern society. However, the updated understanding of modernization no longer requires the disappearance of religion; nor does it regard modernization as an irreversible or strictly linear process of cultural change. Instead, individual autonomy and the pursuit of self-expression have supplanted rationalization, centralization, and bureaucratization.

By the early 2000s, the foundations of secularization theory had largely been dismissed¹², prompting a renewed search for alternative conceptual frameworks. Contrary to sociologists’ predictions, religion did not disappear; instead, religious traditions succeeded in detaching themselves from the structures of traditional society and adapting to postmodern conditions. Even so, observations gleaned from secularization theory retain their own value. Religion now functions as one sub-

system among many, losing its status as a single, overarching worldview and gradually relinquishing more of its nonreligious functions to focus on its core religious role. A universal model of secularization theory was initially constructed based on European historical experience. Analysts of the United States and various European contexts generalized about modernization's impact on religion, yet they largely overlooked the significance of historical, cultural, and religious diversity. Modernization appeared to be the sole form of modernity, with secularization posited as the primary religious process. However, modernization need not necessarily follow a Western trajectory; although the possibility of unique developmental paths was acknowledged, some recurring patterns were deemed likely. The notion of a fundamental contradiction between religion and modernization has thus been called into question.

The lack of universality in secularization theory can be explained through the concept of multiple modernities—modernity does not exist as a singular phenomenon. Instead, it may assume diverse forms, shaped by varying ideological, social, and political circumstances. The coupling of secularization and modernization thus represents merely one of several possible pathways. Indeed, there could be as many types of secularization as there are combinations of political regimes, religious traditions, ideological pursuits, and social conditions.

Recent research increasingly suggests that religion does not vanish from the public sphere but rather undergoes transformations driven by modernization, globalization, and cultural differentiation. Once viewed as a universal tool for analyzing social change in the mid-twentieth century, secularization theory is now being reexamined. Linear narratives predicting the disappearance of religion are giving way to an understanding of multiple modernities, hybrid models of development, and local contexts in which religion still occupies a significant role.

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心理旅游方法在高校心理服务工作中的运用

**THE USE OF THE METHOD OF PSYCHOLOGICAL TOURISM
IN THE WORK OF THE PSYCHOLOGICAL SERVICE OF THE
UNIVERSITY**

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摘要。本文探讨了心理旅游作为高等教育机构心理服务工作方法的一种。关键词：大学心理服务、心理旅游、文化和民族原型。

Abstract. *The article examines psychological tourism as a method of work of the psychological service of a higher educational institution*

Keywords: *psychological service of the University, psychological tourism, cultural and national archetype.*

The realities of modern life are such that the modern system of higher education, like many institutions of civil society, need qualified psychological assistance and, accordingly, an organized psychological service that would meet the needs and requirements imposed on it. Today, many universities have created such services and are successfully functioning. As a rule, the main area of work is related to supporting the educational and upbringing process in the conditions of higher education. However, it is necessary to remember that the process of psychological support of students is impossible without such a concept as psychological culture. Unfortunately, recent decades indicate that this type of culture is not sufficiently formed among modern youth. This is due to a number of features, including social, political, and personal ones, which at the end of the twentieth - beginning of the twenty-first century underwent certain changes and made their own adjustments to the process of formation, formation and development of the personality of young people. Unfortunately, it was during this period that there was a departure from the cultural and historical values that influence and directly shape the national and cultural archetype of a particular people or peoples living

in the same territory. Globalization processes also affected the basic mental values characteristic of representatives of different ethnic groups. All these and other circumstances influenced the formation of personality and created conditions under which modern youth faced certain difficulties related to the fact that personal development, without reliance on traditional values and the foundations of the national and cultural archetype, very often experiences certain crisis situations. The solution to such problems, as a rule, lies in giving a modern young person the opportunity to reveal his personal potential in the context of traditional values. It is the psychological service of the university that can create such conditions that will allow realizing both the personal potential and the hidden possibilities of the cultural archetype inherent in representatives of different cultures.

In this regard, the work of the psychological service should be based on basic mental values and the work carried out should also be built taking into account the national-cultural archetype. In this regard, we propose introducing into the work of this service of universities such a type of work as psychological tourism, which will help to solve several issues at once - and introduce students to the history, culture of the region where they came to receive an education, as well as to reveal their personal potential and solve certain problems that they have encountered both in connection with the processes of adaptation at the university, and other issues that are relevant to them.

Today it is difficult to find a single clear definition of this term. Different specialists put their own meaning into it, thus naming their programs. For us, “Psychological tourism” is, first of all, a vacation with psychological support, closely intertwined with a personal growth program. This is a vacation on a new, deep level, with the discovery of new knowledge not only about the city or the amazing country we are going to, but first of all, new knowledge about ourselves. Enrichment of our inner world, through the prism of the changing external, often through immersion in another era, through symbols that will be encountered along the way. With the help of psychological and psychotherapeutic methods that allow us to transform external experience into internal and appropriate it, with the help of methods that help us accept new knowledge about ourselves, restore psycho-emotional resources. Such a method can be considered as an option for patience and creative self-expression. [1]

The Psychological and Pedagogical Faculty of the Voronezh State Pedagogical Faculty has been implementing the “Psychological Tourism” project for many years.

One of the tasks facing specialists involved in psychological tourism is the task of choosing a route, a place to go with a group. The difficulty of this problem is that a person always or almost always faces the problem of choice (remember Russian, and not only Russian, folk tales, where the main characters face the problem

of choice: if you go to the right..., if you go to the left..., if you go straight..., and then there are ready-made scenarios that await the traveler on the chosen route). In this case, the choice is made by specialists taking into account the tasks and requirements that they set and present both to their work and to the participants in the process; as well as to certain conditions of the event.

Based on our experience in psychological tourism with students of the Voronezh State Pedagogical University, in the course of work carried out in recent years, we have come to certain conclusions that must be taken into account when planning a trip.

1. Selecting a travel destination within the framework of psychological tourism. In this case, much attention is paid to the purpose of a specific event. If the issue is related to the adaptation of first-year students, then the following features should be taken into account: the trip should not be long and take more than 8 hours (including travel); the excursion (preferably) should be held outside large industrial centers, mainly in natural landscape reserves, small provincial towns. If the issue of adaptation is not a priority, and some other tasks and goals are being implemented, then large cities, trips abroad, etc. are possible as a venue.
2. Features required of the place where psychological tourism will be carried out. It should be noted that the objects of the event can be both natural and landscape reserves (Voronezh Biosphere Reserve, Galichya Gora Reserve, etc.), and natural museums-reserves (Divnogorye, Belogorye, etc.); museums-estates (Venevitinovo, Yasnaya Polyana, Tarkhany, Abramtsevo, Spasskoye-Lutovinovo, Konstantinovo, etc.); cities representing the rich historical heritage of our country and the world (Voronezh, Yelets, Ryazan, Moscow, St. Petersburg, Milan, Stockholm and many others); trips can also be carried out to enterprises with the richest traditions and history, which is associated with history and culture, for example, to the Khrenovsky stud farm, where an acquaintance with the museum and the farm itself takes place. As a venue for a psychological tourism program, you can use those places that are not only known to the general public and often visited, but also those that are not so popular, but no less significant for acquaintance and rich in traditions and have a historical past.
3. Time of the trip. As for the time, everything depends on the goals, objectives and requests that are set by both the organizers themselves and those who want to participate in the event. Given our experience, we have developed certain recommendations, which we will provide below. At this stage, the following can be recommended. Firstly, if the event is held outside the city, it is best held in a warm, but not hot, time of year (spring, autumn). Secondly, it is necessary to take into account that the

event should be combined and combine outdoor activities, i.e., in the fresh air and indoors, be it a museum, a hall, etc. Thirdly, it is necessary to think over the issue related to the nutrition of the participants of psychological tourism (group, individual).

4. Participants of the trip. It should be noted that the selection of participants of the event is an important component that affects the result. It is necessary to know that the group should be aimed at a certain result, the group should be homogeneous. Homogeneity can be represented by age, professional, territorial, religious and other components. For the discrepancy of all the previously given parameters can provoke an undesirable result, which will further have a detrimental effect on the development of both the individual as a whole and a certain team, whose task should be to unite and unify the group into a single whole and create a highly organized team of like-minded people and comrades.
5. How and what to conduct. To conduct psychological tourism, it is necessary, first of all, to have a program developed and adapted for certain groups. So, there are programs for preschoolers that take into account the specifics of this age, there are also programs for primary, secondary and senior levels of general education institutions. The program of psychological tourism for students of higher and secondary educational institutions provides for several areas, the leading of which are two: this is the adaptation of first-year students and the solution of certain professional and group problems by participating in the psychological tourism program. For each specific group, there are training programs, usually consisting of two parts: before or after the trip and during the trip. The timing of the first part is set individually for each group, taking into account the psychological characteristics of each individual, in order to determine the work plan and methods for identifying solutions to certain problems and difficulties that an individual encounters during training in a group. In addition, within the framework of the implementation of psychological tourism, problems related to the development and formation of competencies necessary for a future specialist in a particular area of professional activity are solved.
6. After the completion of the trip, recommendations of an individual and collective nature are given (optional), aimed at the formation, development, preservation and restoration of the psychological health of the individual and the group, as well as related to psychological culture as a whole.

Considering the current issues of the work of the psychological service of the university, it should be noted that in modern conditions any problem that arises

in the student environment is significant and important. Regardless of what area it affects - political, social, educational, personal. Here it is very important to remember that psychologists in particular and the service in general in a higher educational institution are the place where students should come with their problems and difficulties, the place to which the younger generation trusts their problems. [2] In this regard, all employees of this service - from management to ordinary employees, with understanding will not only listen, but also help to solve this or that problem. It is very important to use in this work such tools that will be understandable to students, will not cause them rejection, including on a mental level, will be interesting to them and, most importantly, will help to solve certain problems with which they turned to the Service for help.

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海南自贸港建设背景下旅游业在中俄人文交流中的作用探究
**RESEARCH ON THE ROLE OF TOURISM IN CHINA-
RUSSIA PEOPLE AND CULTURAL EXCHANGES UNDER
THE BACKGROUND OF HAINAN FREE TRADE PORT
CONSTRUCTION**

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摘要。 在全球化的浪潮中,中俄人文交流对双边关系的发展意义非凡。随着海南自贸港建设的推进,海南旅游业迎来新契机,成为中俄人文交流的新阵地。本研究深入剖析海南自贸港旅游业的发展优势,阐述中俄人文交流现状,探究海南旅游业在其中的独特作用。海南凭借优越自然条件与丰富文化底蕴吸引大量游客,中俄在文化、教育、旅游等方面交流频繁、成果丰硕。海南自贸港旅游业作为文化传播窗口,展现黎族、海洋等特色文化;作为教育交流纽带,依托国际教育创新岛建设助力学生交流;作为旅游合作典范,打造多元旅游项目。然而,当前面临旅游产品结构单一、服务质量待提升、市场监管需强化等挑战。需创新旅游产品、提升服务品质、加强宣传推广,推动海南旅游业在中俄人文交流中发挥更大作用,为中俄友好关系助力。

关键词: 中俄,海南自由贸易港

Abstract. *In the tide of globalization, people-to-people exchanges between China and Russia are of great significance to the development of bilateral relations. With the promotion of the construction of Hainan Free trade Port, Hainan tourism has ushered in a new opportunity and become a new position for people-to-people exchanges between China and Russia. This study deeply analyzes the development advantages of tourism in Hainan free trade port, expounds the current situation of people-to-people exchanges between China and Russia, and explores the unique role of tourism in Hainan. Hainan has attracted a large number of tourists with its superior natural conditions and rich cultural deposits. China and Russia have achieved frequent exchanges and fruitful results in culture, education and*

tourism. The tourism industry of Hainan Free Trade Port serves as a window of cultural communication, showing the characteristic culture of Li nationality and the ocean; as a link of educational exchange, and relying on the construction of international education innovation island to help students exchange; as a model of tourism cooperation, creating diversified tourism projects. However, it currently faces challenges such as single tourism product structure, improved service quality and strengthened market supervision. It is necessary to innovate tourism products, improve service quality, strengthen publicity and promotion, and promote Hainans tourism industry to play a greater role in people-to-people exchanges and contribute to china-Russia friendly relations.

Keywords: *China-Russia, Hainan Free trade Port.*

1. Introduction

In the context of globalization, people-to-people exchanges among countries have become increasingly frequent, becoming an important bridge for enhancing understanding and promoting cooperation. As major countries, China-Russia and people-to-people exchanges carry profound historical friendship and have far-reaching significance to the long-term development of bilateral relations. In recent years, the construction of the Hainan Free trade Port has made steady progress, injecting strong impetus into Hainans development and opening up broad space for people-to-people and people-to-people exchanges between China and Russia. Hainan, which is becoming a popular international tourist destination with its unique cultural resources and an increasingly open and convenient policy environment. As one of the pillar industries of Hainan Free Trade Port, tourism is becoming increasingly critical in China-Russia people-to-people exchanges. For example, gorgeous ties connect the two peoples, promote people-to-people bond, and build a solid public support for bilateral cooperation in all fields. It is of great practical significance and strategic value to deepen china-Russia cultural exchanges and seize development opportunities to deeply explore the role of Hainan tourism in cultural and China-Russia friendly relations.

2. Analysis of tourism development advantages of Hainan Free trade Port

2.1 Policy advantages: Institutional innovation enables tourism to take off. The construction of Hainan Free Trade Port adheres to the concept of institutional innovation and implements a number of breakthrough policies to promote the development of tourism. In terms of visa policy, the visa-free travel and 30-day stay regulations for Russian tourists from 59 countries will simplify the entry procedures for Russian tourists, reduce costs and stimulate their enthusiasm for traveling to Qiong. In terms of tax policy, the amount of duty-free shopping is increased to enhance the attraction of tourism consumption, and tourists can enjoy shopping. The tax incentives for tourism enterprises reduce the burden of enterprises and

promote them to improve service quality and innovate products. The opening policy of navigation rights has increased international routes, increasing direct flights between Hainan and major Russian cities, shortening flight time and increasing flight frequency. For example, direct flights from Moscow, St. Petersburg to Haikou and Sanya are increased in the peak tourist season to facilitate tourists travel.

2.2 Resource Advantages: Unique charm casts the foundation of tourism. Hainan has superior natural resources and attracts Chinese and Russian tourists. Its tropical seaside scenery, Yalong Bay, Haitang Bay and other places, sand, coconut swaying, is a good place for vacation and leisure; the eastern coast of quality beach and hotels, resorts, tourists can enjoy the sunrise, play water projects, seafood food. Rich in Marine ecological resources, Wuzhizhou and other islands, coral reefs and tropical fish, suitable for diving; coastal wetlands in Wenchang and Qionghai are habitats for migratory birds, bird watching and ecological research activities are popular. Hainan tropical rain forest is vast and mysterious, Wuzhishan, Jianfeng Ridge, Yannoda rain forest cultural tourism area with dense vegetation, rare species, rainforest hiking, stream exploration, tree house experience and other projects have unique features. Hainan has profound cultural resources and unique characteristic culture. Li and Miao ethnic minorities have unique traditional culture, exquisite craftsmanship and exquisite patterns, tourists can visit the villages, observe handicrafts, participate in folk customs, feel the folk customs; Haikou and other historic buildings witness the changes of the island, and tourists can enjoy the Nanyang style architectural style and understand the ancient education system and cultural heritage. Hainan cuisine culture integrates diversified characteristics, diversified seafood cooking, rich tropical fruits, unique characteristic snack flavor, to meet the taste of tourists

3. Insight into the current situation of China-Russia people-to-people exchanges

3.1 Cultural exchanges: The integration of tradition and modernity Cultural exchanges between China and Russia have a long history and achieved fruitful results in recent years. Theme year activities such as “China-Russia Culture Year” and “China-Russia Tourism Year”, such as colorful cultural feast, bring spiritual exchanges across time and space. During the “Year of China-Russia Culture”, various high-level art exhibitions, artistic performances and cultural seminars were held in the two countries. The Russian ballet Swan Lake shows the charm of classical art on the Chinese stage, and traditional arts such as Chinese Peking Opera and acrobatics show the charm of Oriental culture in Russia. By appreciating the classic works, the audiences of both sides understand their cultural connotation, eliminate strangeness, and build a bridge of heart.

3.2 Educational Cooperation: A Bridge between Knowledge and Friendship Educational cooperation is a key link in China-Russia people-to-people exchange-

es, and it has made remarkable achievements over the years. Sino-Russian joint education projects have increased, such as the cooperation between Moscow University in Shenzhen, Harbin Institute of Technology and St. Petersburg State University. They integrate high-quality educational resources, extensive curriculum and international teaching mode to cultivate compound talents and bring new blood to the cooperation between the two countries in various fields. At the same time, the number of Chinese and Russian students has increased steadily. By December 2023, more than 44,000 Chinese students are studying in Russian universities, and more than 12,000 Russian students are studying in Chinese universities. International students, such as non-governmental ambassadors, will promote in-depth understanding and friendly exchanges between the two peoples.

3.3 In recent years, China-Russia tourism cooperation has picked up after the ups and turns of the epidemic. With the disappearance of the epidemic haze and the recovery of the tourism market, there are frequent tourism exchanges between China and Russia. According to statistics, in 2023, Russian tourists to China reached 997,900, while the number of Chinese tourists to Russia was 477,000 in the same period. China and Russia are important source countries and tourist destinations for each other. Developing tourism cooperation plays an important role in driving the development of relevant fields and consolidating the bilateral comprehensive strategic partnership of coordination.

4. The unique role of tourism in Hainan Free Trade Port in the people-to-people exchanges between China and Russia.

4.1 A new window for Cultural Communication Hainans unique culture attracts Russian tourists and becomes a high-quality carrier of cultural communication. Li culture has a long history, the boat house building is unique, carrying the wisdom of the ancestors, Russian tourists walk into the Li village to watch the boat house, can feel the ancient life context; Li brocade famous, colorful, rich patterns, tourists can appreciate its cultural connotation. Hainan has profound Marine culture, and seafood food culture is an important part of it. Steamed grouper and other dishes retain the original flavor, making tourists enjoy the pursuit of Chinese food culture. Tanka fishing steak shows the style of Marine life, and tourists can feel the fireworks of the fishermen. In the tourism interaction, the cultural communication carries on quietly. Russian tourists participate in the traditional festival activities of Hainan, such as the “March 3 rd” of Li and Miao people, singing and dancing with local compatriots across the language barrier, learn Hainan characteristic skills, make Li brocade and coconut carving, understand the ingenuity of traditional craftsmen, bring Hainan cultural memory back to Russia, and let more people understand the diverse culture of Hainan.

4.2 New Link of Educational Exchange The construction of Hainan International Education Innovation Island promotes China-Russia educational exchanges

and builds a cooperation platform. Many internationally renowned universities and educational institutions have settled in, bringing in cutting-edge educational concepts and rich academic resources. Sino-foreign cooperation programs have developed well. For example, Hainan University and Russian universities cooperate to offer Marine science majors, and Hainan Normal University and Russian universities jointly develop art education programs, so that Chinese and Russian students can learn from each other, improve their professional skills and broaden their cultural horizons. Relying on Hainans tourism resources, Chinese and Russian student exchange projects are rich and diverse. The “Study Tour in Hainan” project is popular. Russian students walk around the university campus, listen to academic lectures, participate in seminars, and feel the academic atmosphere; enter the tropical rainforest research base to explore rare animals and plants and establish friendship with Chinese students. The China-Russia Education and Cultural Exchange Week is held regularly, with academic competitions, cultural exhibitions, talent shows and other activities. Students from the two countries will sow the seeds for future cooperation.

4.3 A new model of tourism cooperation Hainan tourism enterprises will build tourism projects and routes that meet the needs of Russian tourists and set a benchmark for China-Russia tourism cooperation. There are famous coastal resort Tours, with many high-end resort hotels along the Haitang Bay and Yalong Bay in Sanya. Russian tourists can stay in sea view rooms, enjoy seaside life, have water sports during the day and taste seafood dinner at night. Health tourism is becoming hot. Hainan attracts Russian tourists with good environment and traditional Chinese medicine health resources. In Boao Lecheng International Medical Tourism Pilot Zone, visitors can experience advanced medical physical examination services; in the TCM physiotherapy hall, traditional TCM projects are favored, and visitors can feel the charm of TCM culture. Here, starting from the old arcade street, visitors can enjoy the carved buildings, window lattice and enjoying the historical charm; going to understand Chinas space achievements; exploring the tropical rain forest of Wuzhishan, feeling the natural and cultural charm, leaving an unforgettable memory.

5. Challenges and coping strategies.

5.1 Existing Challenges In the construction of Hainan Free trade Port and the integration of tourism and Chinese and Russian cultural exchanges, despite their achievements, they still face challenges. On the one hand, the tourism product structure is single, and the products for Russian tourists are mostly concentrated in coastal vacation, such as Sanya beach leisure tour, and the activities are limited to traditional projects, which is difficult to meet their diversified needs. The depth of cultural exploration products is not enough, and the cultural experience of Li nationality is mostly superficial viewing and simple production, and

the connotation is not deeply explored. Health and health tourism products are not perfect. Although the medical resources in Boao Lecheng are advanced, there are shortcomings in rehabilitation services and health environment construction, and it is difficult to form a complete industrial chain. On the other hand, the quality of tourism services should be improved. Language communication barriers are prominent, and the proportion of scenic spots and hotel service personnel is low, which affects the tourist experience. The details of tourism infrastructure are insufficient, and the toilets and rest areas of some scenic spots are unreasonable, and the catering service is difficult to meet the requirements of Russian tourists for western food taste and environment. Moreover, the supervision of the tourism market needs to be strengthened. There are irregularities in the tourism market. Some travel agencies compete at low prices, and arbitrarily increase self-funded items and lower service standards. Seafood catering market shortage, shoddy problems cause complaints, destroy the image of tourism. The quality of tourism practitioners is uneven, and some tour guides have professional knowledgeLack, the explanation to float in the table

5.2 Coping Measures In order to solve the above problems and promote the development of Hainan tourism in people-to-people and cultural exchanges. In terms of innovative tourism products, we will deeply explore Hainan characteristic culture, develop diversified theme routes, such as creating the “Silk Road Hainan” cultural exploration tour, launch the “Rain Forest Health meditation” route, expand adventure tourism products, so as to enrich the tourist experience. It is also crucial to improve the quality of service, strengthen language training for tourism practitioners, add Russian courses in universities and vocational training schools, and require service personnel to master basic Russian sessions. Optimize the tourism infrastructure, reasonably add toilets and rest areas, and improve the frequency of cleaning. Guide catering enterprises to innovate, hire western food chefs, and create a Russian style restaurant. It is urgent to strengthen publicity and promotion. We should use big data to conduct precision marketing, analyze the network habits of Russian tourists, and put personalized advertisements. Famous Russian bloggers and tourism experts will be invited to Hainan to experience and share, holding online and offline interactive activities, such as “The Most Beautiful Hainan” photography competition, China-Russia Tourism and Culture Festival, etc., to enhance the awareness and reputation of Hainan tourism brand.

6. The conclusion

Under the background of the construction of Hainan Free trade Port, tourism has become a key force for people-to-people exchanges between China and Russia. With its natural conditions, cultural charm and policy advantages, Hainan has provided Russian tourists with a wonderful tourism experience, and has made remarkable achievements in cultural communication, educational exchanges, tour-

ism cooperation and other fields. It is like a window for the Russian people to know about Chinese culture, like a bridge to shorten the distance between the two peoples and inject vitality into the china-Russia friendly relations. Although facing tourism product structure, service quality, market regulation, but as long as the confidence, precise ShiCe, continuous innovation products, improve quality, strengthen supervision, Hainan tourism can create more rilliant achievements in people-to-people and cultural exchanges between China and Russia, for the two people know dating, the world cultural symbiosis contribution strength, become an international people-to-people exchanges model.

Funding

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缺氧期间动物血液中肾上腺素含量的变化
**CHANGES IN THE AMOUNT OF ADRENALINE IN THE
BLOOD OF ANIMALS DURING HYPOXIA**

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摘要。低氧血症是由于循环障碍、组织对氧气的需求增加、肺部疾病时肺部气体交换减少、血液中血红蛋白含量降低(贫血)以及吸入空气中的分氧压降低而导致的血液中氧含量降低。低氧血症的后果是缺氧。缺氧期间发生的病理状况是由于组织利用氧气的的能力低于其对氧气的需求。

在缺氧过程中,重要器官会发生不可逆的变化。中枢神经系统、心肌、肾脏组织和肝脏对缺氧最敏感。

研究表明,完整动物缺氧后的第二天,血液中的肾上腺素含量增加了32%。由于缺氧,在第5天和第7天由于肾上腺素的增加,血液循环被打乱,由于肌肉负荷过大,组织需氧量增加,疾病时肺部气体交换减少,血液中血红蛋白的含量减少,最终结果是缺氧。

关键词: 贫血, 血红蛋白, 缺氧。

Abstract. *Hypoxemia is a decrease in oxygen content in the blood as a result of circulatory disorders, increased tissue demand for oxygen, decreased gas exchange in the lungs during lung diseases, decreased hemoglobin content in the blood (anemia), and decreased partial oxygen pressure in the inhaled air. The consequence of hypoxemia is hypoxia. The pathological condition that occurs during hypoxia is due to the fact that the ability of tissues to use oxygen is lower than their need for it.*

During the process of hypoxia, irreversible changes develop in vital organs. The central nervous system, heart muscle, kidney tissue, and liver are most sensitive to hypoxia.

The results of the study show that the day after hypoxia in intact animals, the amount of adrenaline in the blood increases by 32%. As a result of oxygen starvation, due to an increase in the amount of adrenaline on the 5th and 7th days, blood circulation is disrupted, tissue oxygen demand increases due to excessive muscle load, gas exchange in the lungs decreases in diseases, the amount of hemoglobin in the blood decreases, the end result of which is hypoxia.

Keywords: *anemia, hemoglobin, hypoxia.*

Introduction: As a result of a decrease in the supply of oxygen to the body, oxygen starvation-hypoxia occurs in the tissues. Due to a decrease in the partial pressure of oxygen in tissue capillaries during strongly expressed hypoxias, the oxygen supply to the tissues deteriorates significantly and the process of diffusion of oxygen to the tissues is disturbed.

Oxygen starvation of tissues (hypoxia) is a pathological condition caused by a violation of oxygen delivery to tissues in the body, as well as a violation of its absorption by tissues. Sufficient oxygen delivery to tissues is explained by diseases of the respiratory organs, blood circulation, blood system, or a decrease in the partial pressure of oxygen received from the air. Impaired oxygen consumption by tissues usually depends on a deficiency of respiratory enzymes or slow diffusion of oxygen across the cell membrane.

As a hypoxia-oxygen deficiency, it causes a decrease in the amount of oxygen in the tissues. The aggravation of the pathological condition during hypoxia is related to the fact that the oxygen consumption of the tissues is lower than the demand. Due to this, irreversible changes occur in the vital organs. The central nervous system, heart muscle, kidneys and liver are more sensitive to oxygen deficiency. As a result of acute hypoxia, first of all, the function of the higher departments of the central nervous system is disturbed, as a result of chronic hypoxia, the cardiovascular system, respiratory system, and blood system are damaged. In this regard, the study of the effect of hypoxia on the body's hormonal processes was of interest. The hormone adrenaline is a mediator of the nervous system, a hormone of the brain layer of the adrenal glands, plays an important role in the vital functions of animals and humans. It is formed from phenylalanine and tyrosine amino acids in the chromaffin granules of the adrenal glands, from where it is released into the bloodstream. Entering the blood, adrenaline increases oxygen consumption of organs and tissues, participates in the mobilization of glycogen, resulting in an increase in blood sugar, stimulates metabolism, increases blood pressure, increases and increases heart rate, accelerates the rhythm of breathing. In some diseases adrenaline content in the body adrenaline content in the body increases or decreases, which can complicate the course of the disease. In this connection, we decided to study the changes in the amount of adrenaline in hypoxia.

Material and Methods: The studies were conducted on intact and hypoxic 1-year-old male rabbits. It is of particular interest to study hormonal changes in hypoxic animals. The following hypoxia model was chosen for animal hypoxia: nitrogen (N_2) 93% and oxygen (O_2) 7%. Hypoxia was carried out by the method of V.P. Khvatov and Y.M. Khvatova (1978) in barochambers with a total area of 0.12 m². Animals were subjected to oxygen deprivation in barochambers with a gas mixture of 7% O_2 and 93% N_2 .

The method of immunoenzymatic analysis was used to determine hormones in the blood. Researches were conducted in 2 series:

In the first series of experiments, we determined the amount of adrenaline in the blood of intact animals - 1-year-old rabbits.

In the second series of experiments, we studied the effect of the hypoxia factor on the amount of adrenaline in the blood of 1-year-old rabbits.

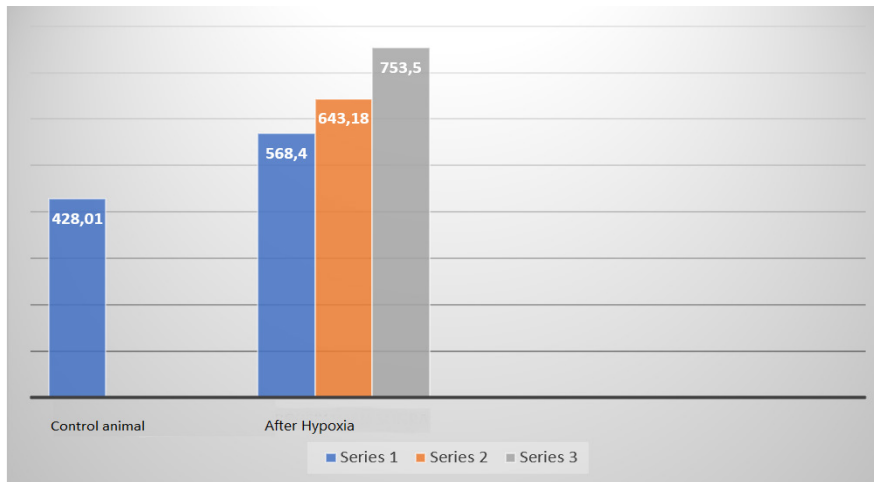
The results of the series of studies were as follows:

Results:

Table

Amount of adrenaline in the blood of hypoxia animals. (u/ml)

Control	1st day	5th day	7th day
X 428,01±8,6	568,4±12,3	643,18±5,6	753,5±12,3
	P<0,001	P<0,001	P<0,001



Description of the results obtained by series.

After hypoxia;

Series 1- 1 day after hypoxia

Series 2- 5 days after hypoxia

Series 3- 7 days after hypoxia

Conclusion: In 1-year-old rabbits, hypoxia was created, on the 1st, 5th and 7th days of hypoxia, the amount of adrenaline in the blood increases significantly.

When 1-year-old rabbits are exposed to hypoxia, an increase in the level of adrenaline in their blood is observed. The increase in adrenaline secretion of the brain layer of the adrenal gland manifests itself in the course of stress factors and physiological processes in the body.

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人工通气对急性脑供血不足患儿自主神经张力昼夜节律的影响
**THE EFFECT OF ARTIFICIAL VENTILATION ON THE
CIRCADIAN RHYTHM OF AUTONOMIC TONE IN ACUTE
CEREBRAL INSUFFICIENCY IN YOUNG CHILDREN**

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摘要。一项关于人工通气对急性脑衰竭幼儿自主神经张力昼夜节律影响的研究显示,第1组(自主呼吸)第1天交感神经反应增加40%,第2组(人工通气)增加70%。第2组MCI儿童的应激保护疗法使强化综合治疗的前20天内交感神经活动强度降低23%。第2组(93天)的平均交感神经活动水平明显低于第1组9%,低于第2组(前20天)7%。两组ACF中脉搏动脉压(PAP)增加的趋势可以作为应激交感神经张力反应的标志。

关键词:人工通气、昼夜节律、自主神经张力、急性脑衰竭、儿童。

Abstract. *A study of the effect of artificial ventilation on the circadian rhythm of autonomic tone in acute cerebral failure in young children revealed an increase in the sympathotonic reaction on day 1 in group 1 (spontaneous breathing) by 40%, in group 2 (artificial ventilation) by 70%. Stress-protective therapy of MCI in children of group 2 made it possible to reduce the intensity of sympathotonic activity by 23% during the first 20 days of intensive complex therapy. The average level of sympathetic activity in group 2 (93 days) was significantly lower than in group 1 by 9%, and 7% less than in group 2 (first 20 days). The tendency to increase in pulse arterial pressure (PAP) in ACF in both groups can serve as a marker of the stress sympathotonic reaction.*

Keywords: *artificial ventilation, circadian rhythm, autonomic tone, acute cerebral failure, children.*

Relevance. Acute cerebral failure (ACF) is a critical condition caused by the loss of higher and basic nervous activity by the body, as well as neuronal regulation of the activity of vital organs and systems. Along with clinical and laboratory manifestations of brain damage, acute cerebral failure is accompanied by dysfunction of vital organs and body systems, complicating the course of the critical condition. Acute cerebral failure is a life-threatening condition accompanied by “neurogenic” multiple organ failure, the development of which aggravates the course of the disease and increases the risks of an unfavorable outcome. “Neurogenic” organ dysfunction requires clinicians to conduct basic monitoring of vital parameters, a set of measures for the prevention and treatment of neurogenic abnormalities. The main clinical manifestation of ACI is depression of consciousness and brainstem reflexes, which can be accompanied by autonomic disorders and convulsive syndrome, which together lead to the development of hypoxia and dysfunction of the cardiovascular system, leading to the death of the organism. The mechanism of neurogenic cardiopathy is described, including excessive activation of the sympathetic system with persistent vasospasm of the coronary basin, which is accompanied by subendocardial myocardial infarction [1-4]. However, there is no information in the literature on the effect of artificial ventilation on autonomic regulation in ACI in children, which was the reason for conducting this study.

Objective of the work. To study the effect of artificial ventilation on the circadian rhythm of autonomic tone in ACI in young children.

Material and methods of research. The results of continuous prolonged monitoring of hemodynamics and respiration in children admitted to the intensive care unit of the Russian Scientific Center of Emergency Medicine in a critical condition caused by infection complicated by acute cerebral and respiratory failure at the age of 5.5 months to 2.5 years were studied. 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 (MRS) 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 upon admission to the clinic was assessed using the Glasgow scale and was 9.1 ± 0.4 in group 1 and 6.5 ± 1.0 points in group 2, which corresponded to a reliably significant suppression of brain function by 29% in group 2, which determined the duration of MCI, the duration of intensive care in the ICU and in the hospital as a whole. After awakening, restoration of adequate breathing, reflexes, and consciousness within one to two days, the children were transferred to a specialized department. The research data were processed by the variation statistics method 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 t-test was used. The relationship between the dynamics of the studied parameters was determined by the paired correlation method. The critical significance level was taken to be 0.05. The calculation of the autonomic tone (CAT) was performed using the following formula: $CAT = \text{patient's PBP} \times \text{patient's HR} / \text{norm. PBP} \times \text{norm. HR}$.

Results and their discussion.

As shown in Table 1, no significant differences were found in the average mesor indices of the circadian rhythm of the CAT, the CAT index in the acrophase, bathyphase, amplitude, or daily range of fluctuations of the CAT index in the circadian rhythm during the observation period. The reliability of the differences in the CAT index in Group 2 (93 days) in the acrophase (by 33%) and bathyphase in Group 1 (by 21%) relative to the mesor indicated a significant change in the index in the circadian biorhythm of the CAT in the first 20 days of observation, both during spontaneous breathing and in children on mechanical ventilation.

Table 1.
Average values of the parameters of the phase structure of the circadian rhythm of the CAT in children under 3 years of age with ACI

	Mesor	In acrophase	In the bathyphase	Amplitude	Daily range
1 group	1,4±0,1	1,6±0,1	1,1±0,1*	0,3±0,1	0,5±0,1
2 group (20 days)	1,3±0,1	1,5±0,1	1,1±0,1	0,2±0,03	0,4±0,1
2 group (93 days)	1,2±0,1	1,6±0,2*	0,9±0,2	0,3±0,2	0,7±0,3

--reliable difference relative to mesor

The increase in the sympathotonic reaction on day 1 in group 1 was 40%, in group 2 70%, remaining elevated in the following days. Moreover, in group 1, a slight tendency to increase the indicator was noted, while more radical stress-protective therapy of MRP in children of group 2 made it possible to reduce the intensity of sympathotonic regulation by 23% (p<0.05) during the first 20 days of intensive complex therapy (Table 2).

Table 2.
Circadian rhythm mesor CAT

Days	1 group	2 group
1	1,4±0,2	1,7±0,2
2	1,3±0,1	1,4±0,1
3	1,2±0,1	1,4±0,1
4	1,4±0,1	1,3±0,1''

5	1,3±0,1	1,3±0,1”
6	1,3±0,1	1,2±0,1”
7	1,3±0,1	1,3±0,1”
8	1,4±0,1	1,3±0,1”
9	1,2±0,1	1,3±0,1”
10	1,4±0,1	1,4±0,1
11	1,4±0,1	1,3±0,1”
12	1,5±0,1	1,4±0,1
13	1,5±0,1	1,3±0,1”
14	1,3±0,1	1,3±0,1”
15	1,4±0,1	1,3±0,03”
16	1,5±0,1	1,3±0,1”
17	1,2±0,1	1,3±0,1”
18	1,5±0,1	1,4±0,1
19	1,2±0,1	1,3±0,1”
20	1,5±0,1	1,4±0,1

Table 3.

Average circadian rhythm of CAT

Hours	1 group	2 group 20 days	2 group 93 days
8	1,3±0,2	1,3±0,1	1,2±0,2
9	1,3±0,2	1,3±0,1	1,2±0,2
10	1,4±0,2	1,3±0,1	1,2±0,2
11	1,4±0,1	1,3±0,1	1,2±0,2
12	1,4±0,1	1,3±0,1	1,2±0,2
13	1,4±0,1	1,4±0,1	1,2±0,2
14	1,4±0,1	1,4±0,1	1,2±0,2
15	1,4±0,1	1,4±0,1	1,2±0,2
16	1,4±0,1	1,4±0,1	1,2±0,2
17	1,4±0,1	1,3±0,1	1,2±0,2
18	1,4±0,1	1,3±0,1	1,2±0,2
19	1,4±0,1	1,3±0,1	1,3±0,2
20	1,4±0,1	1,3±0,1	1,2±0,2
21	1,4±0,1	1,3±0,1	1,2±0,2
22	1,4±0,2	1,3±0,1	1,2±0,2
23	1,4±0,1	1,3±0,1	1,2±0,2
24	1,3±0,2	1,3±0,1	1,2±0,2
1	1,3±0,1	1,3±0,1	1,2±0,2
2	1,3±0,1	1,3±0,1	1,2±0,2
3	1,3±0,1	1,3±0,1	1,2±0,1

4	1,3±0,1	1,3±0,1	1,2±0,2
5	1,3±0,1	1,3±0,1	1,2±0,2
6	1,3±0,1	1,3±0,1	1,2±0,2
7	1,4±0,1	1,3±0,1	1,2±0,2

” - the difference is reliable relative to the indicator in 1 day.

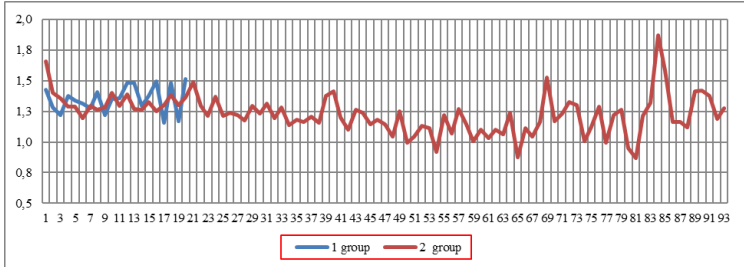


Figure 1. Dynamics of the mesocircular rhythm of the CAT, units.

Three patients had a tendency to decrease in CAT almost to the physiological level by day 65, but a hypersympathotonic reaction in the following days was noted in patient R., admitted at the age of 2 years, weight 14 kg (Fig. 1). Diagnosis: bilateral confluent pneumonia, acute ethylene glycol poisoning (ambronol syrup “Curamax”) somatogenic stage, acute tubulointerstitial nephritis of toxic etiology. IDS. Complication - ARF stage 3, AHF 2a, acute renal failure (ARF) renal form in the stage of anuria, ascites, toxicometabolic encephalopathy. Cerebral edema, ACI. Toxic hepatitis.

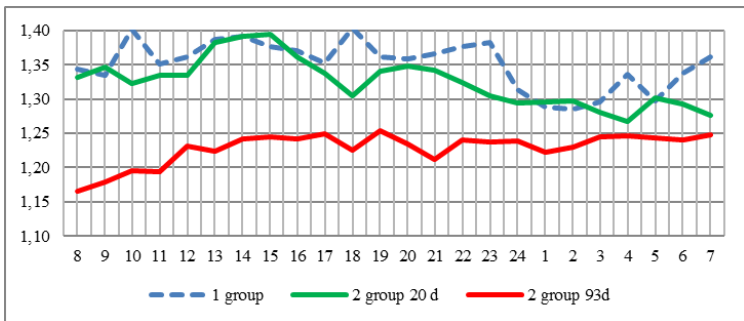


Figure 2. Average circadian rhythm of the CAT, units.

Note the comparatively low level of sympathotonic reaction according to the average circadian rhythm of the CAT in group 2 (93 days) relative to the same indicator in groups 1 and 2 during the first 20 days (Fig. 2). Thus, the average level

of sympathetic activity in group 2 (93 days) was significantly lower than in group 1 by 9%, and 7% lower than in group 2 (in the first 20 days) ($p < 0.05$, respectively). The tendency to increase the amplitude of the circadian rhythm of the pulmonary arterial ventilation, especially in children of group 2 after 35 days of mechanical ventilation, was caused by the stress reaction of the autonomic nervous system in connection with aggravating factors, the main one of which is the inflammatory reaction to infection, pneumonia, extracorporeal methods of detoxification, which caused difficulties in managing patients on prolonged mechanical ventilation, including manipulations necessary to ensure adequate ventilation of the lungs with increased oxygen demand of the brain, other organs in conditions of lungs damaged by the inflammatory reaction (Fig. 3).

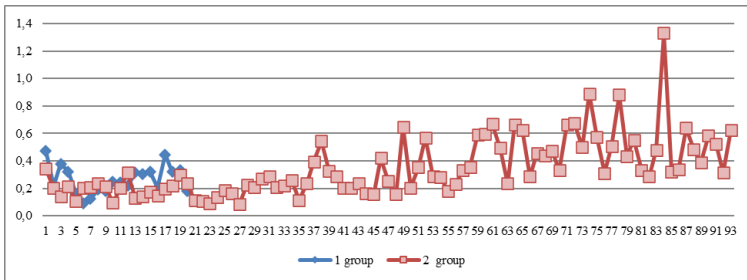


Figure 3. Dynamics of the amplitude of the circadian rhythm of the CAT, units.

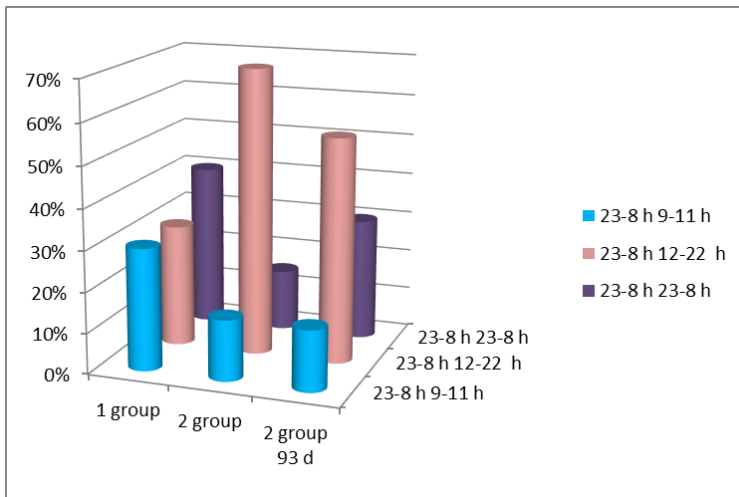


Figure 4. Duration of the inversion of the circadian rhythm of the CAT, %.

A tendency towards an increase in the duration of the inversion of the circadian rhythm of the CAT was revealed in Group 1 by 40%, which indicated a comparatively more pronounced stress reaction of the autonomic regulation than in Group 2 (Fig. 4).

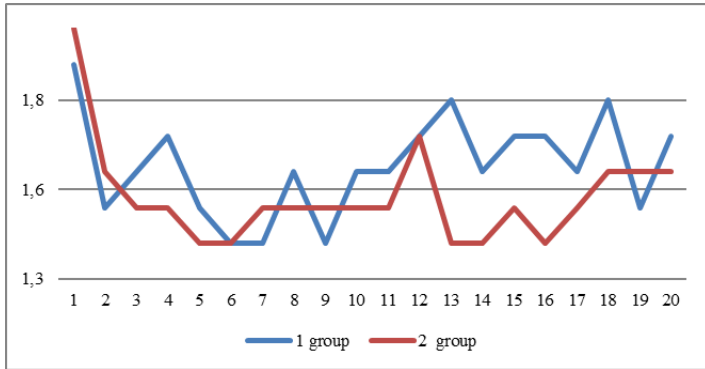


Figure 5. The effect of artificial ventilation on the CAT in the acrophase, units.

The dynamics of the maximum indices of sympathetic activity in the acrophase of the CAT circadian rhythm is of interest. A comparatively lower level of activity was revealed in group 2, represented by a biphasic wave-like curve with a phase width of 12 and 6 hours, and a somewhat more active sympathicotonic reaction in group 1 with an almost synchronous oscillation of CAT in the acrophase at a somewhat higher level of functional activity (Fig. 5).

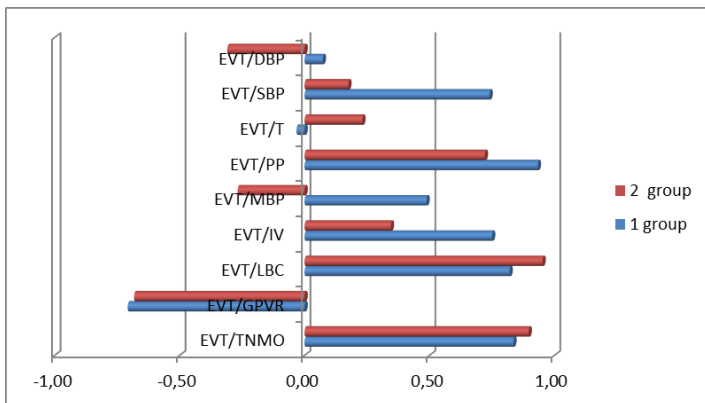


Figure 6. Correlation relationships of the mesomorph of the circadian rhythm of the CAT

A reliable significant correlation direct relationship of the CAT and the MVB in groups 1 (0.84) and 2 (0.9) corresponded to an increase in the myocardial oxygen demand due to hypersympathotonia (Fig. 6). The noted direct relationship of the formation of a hyperdynamic type of blood circulation under conditions of an increase in the influence of sympathetic tone, evidenced by the correlation relationship of the CAT/MVB in group 1 was 0.82, and in group 2 (0.95) in the first 20 days. The inverse correlation of the CAT and the MVB in group 1 (-0.71), in group 2 (-0.68) confirm the vector of the dynamics of changes in blood circulation. The tendency for PBP to increase with ACI in both groups can serve as a marker of stress sympathotonic reaction, as evidenced by the direct correlation between PBP and CAT in group 1 (0.93) and in group 2 (0.72).

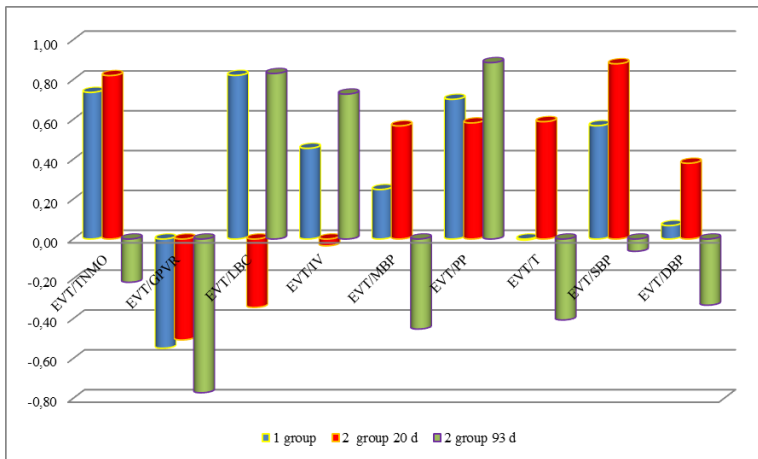


Figure 7. Correlation relationships of the average circadian rhythm of the CAT.

During prolonged mechanical ventilation for 90 days in child R., who underwent 31 hemodialysis sessions, 4 - plasmapheresis due to acute renal failure introduced some changes in the adaptive reactions of hemodynamic parameters. Thus, the direct correlation relationship of the PMC and CAT, which was 0.74 in group 1, 0.82 during the first 20 days in group 2, disappeared and was 93 days in group 2 (-0.22). Despite the remaining negative correlation of the average circadian rhythms of the CAT and TPR in group 1 (-0.55), in group 2 (-0.51), in the child of group 2 it increased and became (-0.77). In group 2 (93 days), the direct effect of CAT on the formation of a hyperdynamic hemodynamic reaction increased according to the parameters of MVB (0.83), SV (0.73), and PBP (0.89) (Fig. 7).

Conclusion. The increase in the sympathotonic reaction on day 1 in group 1 was 40%, and 70% in group 2. Stress-protective therapy of MCI in children of

group 2 made it possible to reduce the intensity of sympathotonic regulation by 23% during the first 20 days of intensive complex therapy. The average level of sympathetic activity in group 2 (93 days) was significantly lower than in group 1 by 9%, and 7% less than in group 2 (the first 20 days). The tendency to an increase in PBP with ACI in both groups can serve as a marker of a stress sympathotonic reaction.

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人工通气对3岁以下急性脑供血不足患儿窦房结功能活动昼夜节律的影响
**THE EFFECT OF ARTIFICIAL VENTILATION ON THE
CIRCADIAN RHYTHM OF THE FUNCTIONAL ACTIVITY OF
THE SINUS NODE IN CHILDREN WITH ACUTE CEREBRAL
INSUFFICIENCY UNDER THE AGE OF 3 YEARS**

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摘要。第一天，转入人工通气的儿童心率昼夜节律中胚层比第 1 组（自主呼吸）高 21%，并且在整个观察期内保持增加。第 1 组和第 2 组中，CI 指标在 0.96 - 1.1 单位的水平波动表明在前 20 天内心律明显僵化。第 2 组心率昼夜节律倒置时间最长（93 天），占 ICU 重症监护总时间的 38%（37 天）。第 2 组儿童的每日心率波动也证实了人工通气的压力保护性纠正效果不足。

关键词：人工通气、昼夜节律、心律、儿童、急性脑供血不足。

Abstract. *In the first day, the mesomorph of the circadian rhythm of the heart rate in children transferred to artificial ventilation was greater than in Group 1 (spontaneous breathing) by 21%, remaining increased throughout the observation period. Fluctuations in the CI indicator at the level of 0.96 - 1.1 units characterized pronounced rigidity of the heart rhythm already in the first 20 days in both Groups 1 and 2. The longest inversion of the circadian rhythm of the heart rate was in Group 2 (93 days), amounting to 38% (37 days) of the total duration of intensive care in the ICU. Confirmation of insufficiently effective stress-protective correction of artificial ventilation in children of Group 2 were also daily fluctuations in heart rate.*

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

Relevance. Due to the age-related immaturity of the circulatory system in severe infectious diseases, acute cerebral insufficiency of the brain in early childhood is characterized by a more frequent rapid development of acute heart failure, primarily due to the development of an energy-deficient state of the myocardium. In practical medicine, circadian index (CI) monitoring is widely used. The indicator is not affected by either the age or the gender of the subject. A normal circadian profile indicates a stable vegetative organization of the daily rhythm. There are deviations of the circadian index both upward and downward. The norm of the circadian index in adult men and women should be within 1.24-1.44. If the CI is elevated, this is a sign of high sensitivity of the myocardium to sympathetic stimulation. In some cases, an enhanced circadian profile is an individual norm for a person accustomed to intense physical activity. A decrease in the index is considered an indicator of cardiovascular disorders. A decrease in the CI is an unfavorable sign indicating autonomic denervation of the heart. This means that the sympathetic and parasympathetic divisions of the VNS regulate myocardial contractions incorrectly. If the indicator is persistently deviating downwards, it can be said that the contractility of the myocardium has decreased, and the patient has developed irreversible changes in the myocardium and chronic heart failure. A drop in the circadian index to 1.2 is a sign of heart failure with a risk of death. Rigidity of the heart rate during treatment is a poor prognostic sign, while an increase in it is a guarantee of the adequacy of the prescribed therapy. However, there is insufficient information in the literature on the characteristics of changes in the CI in acute cerebral insufficiency (ACI) in children, which prompted us to study this issue [1-6].

Purpose of the work. To study and evaluate the effect of artificial lung ventilation on the circadian rhythm of heart rate in acute cerebral failure in 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 due to 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 artificial lung 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 mechanical respiratory support (MRS), the du-

ration of intensive care in the ICU and in the hospital as a whole. 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 means (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 discussion. The study of the effect of mechanical ventilation on the average values of the parameters of the phase structure of the circadian rhythm of the heart rate for the entire observation period allowed us to state the reliability of the deviation of the heart rate in the acrophase in children of group 1 by 7%, in the bathyphase by 6%. In group 2, over 93 days of observation, the difference in the heart rate in the acrophase from the mesor was 12%, which confirms the circadian rhythm of the functional activity of the sinus node both during spontaneous breathing and during mechanical ventilation in children with ACI at an early age (Table 1).

Table 1.
Average values of the parameters of the phase structure of the circadian rhythm of the heart rate

Groups	Mesor	In acrophase	In the bathyphase	Amplitude	Daily range
1	122±3	131±3*	114±4*	8±2	16±4
2 group (20 days)	129±4	138±5	120±4	9±3	18±5
2 group (93 days)	123±6	138±6*	109±9	15±6	28±11

* - the difference is reliable relative to the mesor.

Table 2.
Mesozoic circadian rhythm heart rate

Days	1 group	2 group
1	124±4	151±8'''
2	119±4	132±4'''
3	119±6	132±3'''
4	121±3	127±3
5	121±2	129±3'''
6	119±1	130±6'''
7	121±4	127±5
8	125±2	123±5
9	121±4	127±3
10	116±3	128±2'''

11	118±4	127±7
12	124±5	127±4
13	131±2	120±4 ^m
14	127±6	123±2
15	126±4	125±3
16	123±5	124±4
17	122±4	125±4
18	122±3	131±2 ^m
19	124±4	130±4
20	124±4	139±4 ^m

Table 3.
Average circadian rhythm of heart rate.

Hours	1 group	2 group 20 days	2 group 93 days
8	126±5	131±4	125±9
9	125±5	129±4	125±7
10	124±5	130±4	125±7
11	123±5	129±4	124±7
12	124±4	128±6	123±9
13	124±4	130±6	123±9
14	124±4	129±5	123±9
15	123±3	130±4	123±9
16	124±4	131±5	123±9
17	124±4	132±6	124±10
18	124±4	132±7	125±8
19	124±4	131±7	125±8
20	123±4	131±6	123±8
21	123±4	131±7	122±9
22	122±4	130±6	122±10
23	121±4	129±5	121±9
24	120±5	128±6	121±9
1	119±4	127±6	120±9
2	119±4	125±5	121±7
3	118±4	123±5	120±8
4	119±5	124±6	120±8
5	120±4	124±5	122±8
6	122±3	125±5	124±8
7	122±5	126±5	124±7

^m - the difference is reliable relative to the indicator in group 1

In the first 20 days of treatment, a tendency towards an increase in the average level of the mesomorph of the circadian rhythm of the heart rate in MRS by 6% was revealed. Already on the first day, the mesomorph of the circadian rhythm of the heart rate in children who needed MRP was higher than in group 1 by 21% ($p < 0.05$), remaining on days 2, 3, 5, 6, 10, 13, 18, 20 significantly increased by 10%, 10%, 6%, 7%, 10%, 8%, 7%, 11% ($p < 0.05$, respectively) (Table 2). Despite the stress-protective therapy, the mesomorph of the circadian rhythm of the heart rate in group 2 children was characterized by more pronounced instability at a higher level both in the first 20 days of intensive care and in the following days. Moreover, after 70 days, the child's repeated hemodialysis due to acute renal failure turned out to be more aggressive, when the corrective, protective therapy was not effective enough, as evidenced by the fluctuations in the mesosphere of the circadian rhythm from 133 to 92 beats per minute, indicating the development of an acute energy-depleting state, increasing the risk of developing acute circulatory failure (Fig. 1).

No significant differences in the average circadian rhythm of the heart rate in group 2 were found for 93 days of observation relative to group 1 (Table 3). However, in the first 20 days, a tendency to HR fluctuations at higher heart rate values was noted (Fig. 2) with a shift in the acrophase of the circadian rhythm of the heart rate by 7 hours. The coincidence of the HR projection in the bathyphase in groups 1 and 2 at 3 a.m. was noteworthy.

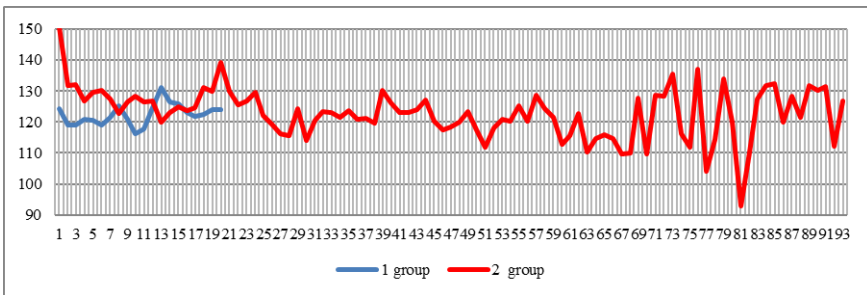


Figure 1. Dynamics of the mesomorphic circadian rhythm of the heart rate, beats per minute

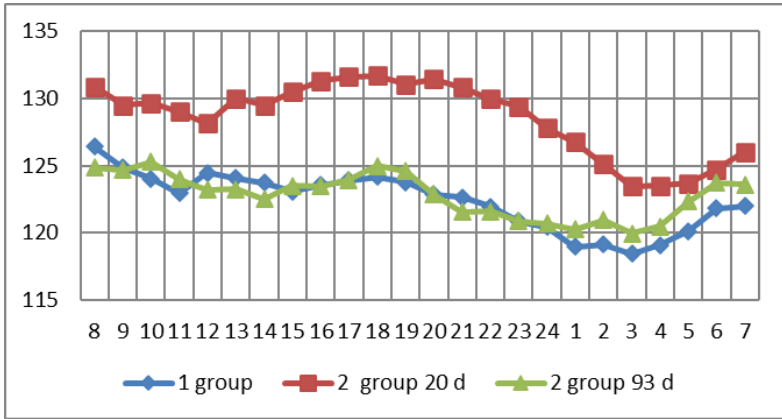


Figure 2. Average circadian rhythm of heart rate, per minute

Fluctuation of the CI indicator at the level of 0.96 - 1.1 units characterized pronounced rigidity of the heart rhythm already in the first 20 days in both groups 1 and 2. The conducted MRS did not improve the rigidity of hypersympathetic regulation of the sinus node function, and only on the 90th day a tendency towards normalization of the indicator was noted, possibly as a result of the child's transfer to independent breathing (Fig. 3).

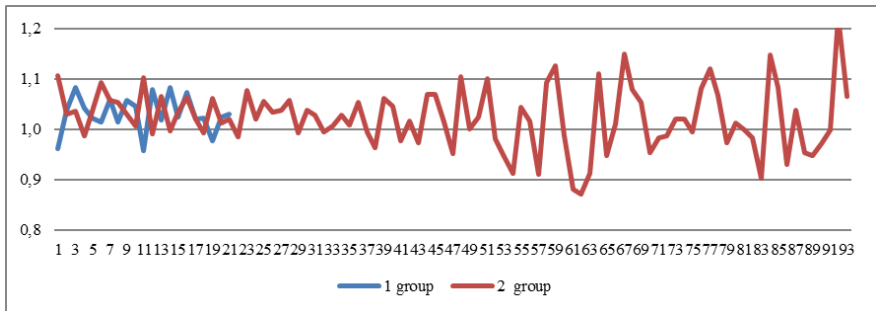


Figure 3. Dynamics of the circadian index, units.

The stressful state of the functional activity of the heart pacemaker was confirmed by an increase in the amplitude of the circadian rhythm of the heart rate in children of the 2nd group after 40 days of intensive therapy (Fig. 4).

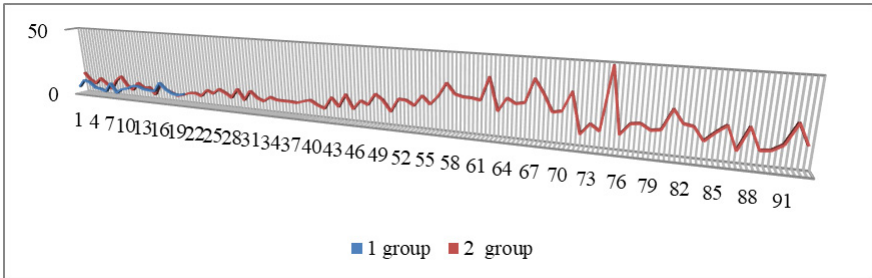


Figure 4. Dynamics of the amplitude of the circadian rhythm of the heart rate, beats per minute

Confirmation of the insufficiently effective stress-protective correction of artificial ventilation in children of the 2nd group were daily fluctuations in the heart rate up to 70 beats per minute on the 40th-90th day of intensive care (Fig. 5). Thus, artificial ventilation, carried out according to existing recommendations, aimed primarily at protecting the brain from ischemia and secondary damage in acute cerebral insufficiency in young children, turned out to be insufficiently effective in conditions of aggravation of the general condition by additional factors and requires further study and new developments to improve not only the artificial ventilation, but also drug protection.

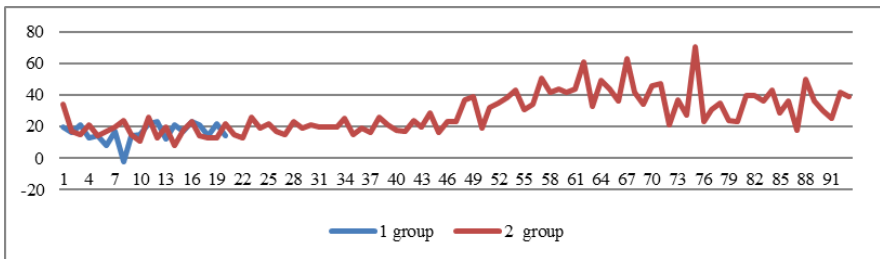


Figure 5. Daily fluctuations in heart rate, beats per minute

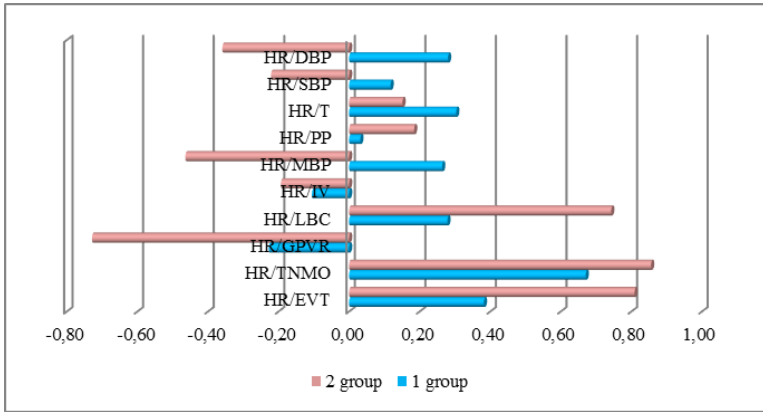


Figure 6. Correlation relationships of the mesomorph of the circadian rhythm of the heart rate.

The tendency to increase the MVP with an increase in heart rate (0.67) in group 1 becomes natural during mechanical ventilation, amounting to 0.86 due to the sympathotonic reaction in group 2, as evidenced by the direct relationship between the heart rate and the total peripheral vascular resistance (0.81). This is accompanied by a hyperdynamic direction of hemodynamic changes. Thus, in group 2, an inverse correlation relationship was found between the heart rate and total peripheral vascular resistance (-0.73), a direct correlation between the dynamics of the heart rate and cardiac output (0.74) (Fig. 6).

Evaluation of the correlation relationships of the circadian rhythms of the studied parameters revealed a direct dependence of the MVP on the heart rate in all patients, which was in group 1 (0.95), over 20 days in group 2 (0.97), over 93 days in group 2 (0.94). Direct involvement of the increase in HR in the decrease in IOC (-0.7), as well as in the decrease in SV (-0.88), and in the decrease in PBP (-0.78) indicated the development of acute circulatory failure in group 2 (93 days). The compensatory capabilities of hemodynamics in the first 20 days of mechanical ventilation were indicated by the direct correlation between HR and SBP (0.7), HR and DBP (0.83), which significantly decreased in the following days of intensive care against the background of MCI (Fig. 7).

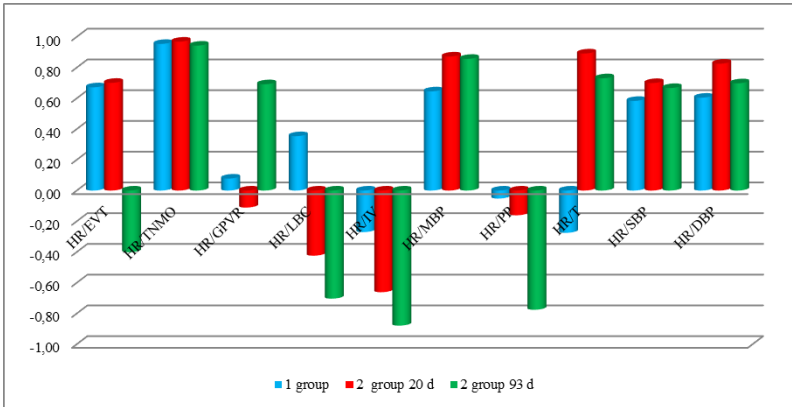


Figure 7. Correlation relationships of average circadian rhythms of heart rate.

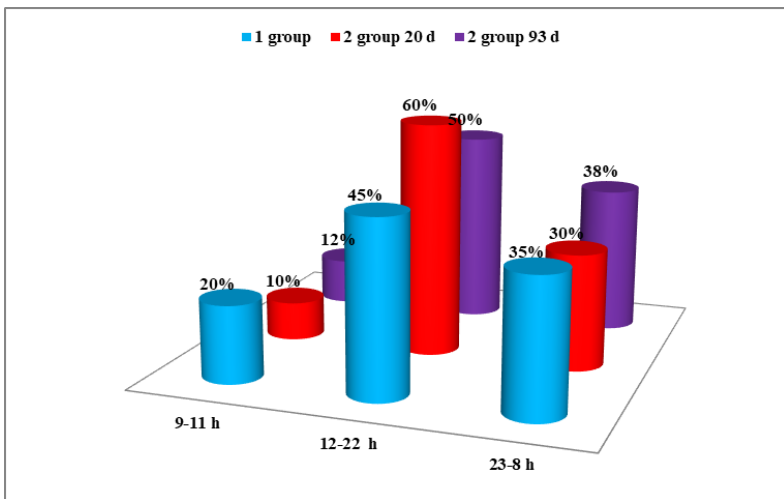


Figure 8. Duration of circadian rhythm inversion of heart rate in % relative to the duration of stay in the intensive care unit.

The longest inversion of the circadian rhythm of heart rate was in group 2 (93 days), amounting to 38% (37 days) of the total duration of intensive care in the intensive care unit.

Conclusion. Confirmation of the circadian rhythm of the functional activity of the sinus node was revealed both during spontaneous breathing and during mechanical ventilation in children with acute cerebral insufficiency at an early age. In

the first day, the meso of the circadian rhythm of heart rate in children transferred to mechanical ventilation was 21% higher than in group 1, remaining increased throughout the observation period. Fluctuations in the CI indicator at the level of 0.96 - 1.1 units characterized pronounced rigidity of the heart rhythm already in the first 20 days in both groups 1 and 2. The longest inversion of the circadian rhythm of the heart rate was in group 2 (93 days), amounting to 38% (37 days) of the total duration of intensive care in the ICU. The insufficiently effective stress-protective correction of mechanical ventilation in children of group 2 was confirmed by daily fluctuations in heart rate.

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幼儿急性脑供血不足的呼吸频率昼夜节律

CIRCADIAN RHYTHM OF RESPIRATORY RATE IN ACUTE CEREBRAL INSUFFICIENCY IN YOUNG CHILDREN

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摘要。在感染并发急性脑衰竭的幼儿治疗的第一天，第 2 组患者的 ARF 表现更为明显，呼吸频率比第 1 组增加了 25%。第 2 组（机械通气）的所有儿童在第 8-13 天都需要 MRP，因为 ARF 进展更为严重。即使在后期，恢复自主呼吸后，第 2 组儿童的 ARF 也比第 1 组（未使用机械通气）的患者更明显。通过研究呼吸频率的平均昼夜节律之间的相关性，我们能够在第 1 组中建立更显著的补偿机制。在第 2 组儿童中，发现外部呼吸功增加的趋势，心输出量和每搏输出量减少。

关键词：昼夜节律、呼吸频率、急性脑衰竭、儿童。

Abstract. *In the first day of treatment of young children with infection complicated by acute cerebral failure, more pronounced ARF was manifested by an increase in respiratory rate by 25% in Group 2 relative to the indicator in Group 1. All children in Group 2 (mechanical ventilation) needed MRP on days 8–13 due to more severe progressive ARF. Even at later stages, restored spontaneous breathing indicated more pronounced ARF in children in Group 2 relative to patients in Group 1 (without mechanical ventilation). The study of correlations between the average circadian rhythm of respiratory rate allowed us to establish more significant compensatory mechanisms in Group 1. In children in Group 2, a tendency was found to increase the work of external respiration with a decrease in cardiac output and stroke volume.*

Keywords: *circadian rhythm, respiratory rate, acute cerebral failure, children.*

Relevance. *In early age periods (in newborns, infants and young children), inflammation is characterized by two main features: when an inflammatory focus occurs, a tendency to generalization is clearly defined due to the inability of the*

macroorganism to limit the local process, which depends on the age, anatomical and functional immaturity of the organs of immunogenesis and barrier tissues, which facilitates the penetration of pathogens and their toxins into the bloodstream and lymph; in newborns and infants, some special types of alterative and productive inflammation are observed, which are close to the inflammatory reaction of the intrauterine period and reflect the formation of this reaction in phylo and ontogenesis. At the same time, the authors of numerous studies take into account that the presence of special forms of inflammation does not exclude the development of exudative, even purulent inflammation in the fetus, newborn and infant. The listed features are characteristic of a young child, when his reactions are close to reactions during the period of intrauterine development. Later, these features lose their significance, but the tendency for the local inflammatory process to generalize accompanies almost the entire period of childhood [Ivanovskaya T. E., 1978; Essbach H., 1960], therefore, a primitive form of infectious disease, sepsis, easily develops in young children. Systemic inflammatory response (SIR) is considered to be the main pathogenetic link in sepsis. The most severe complication of SIR is progressive multiple organ failure (POF). Mortality from PMF remains extremely high, reaching 80% of the total mortality in intensive care units. Patients with childhood acute and chronic neurological diseases often have the following disorders of the bronchopulmonary system: insufficiency of effective inhalation and exhalation due to impaired muscle innervation and their atrophy; ineffectiveness of the cough reflex, imbalance between the production and resorption of sputum, dysknetic changes in the bronchi; decreased immunity and tendency to chronic infection, frequent intercurrent infections; congestive manifestations in the lungs due to limited range of motion; high risk of aspiration pneumonia; impaired mucociliary clearance can contribute to the development of atelectasis, which leads to ventilation perfusion of the respiratory muscle and respiratory failure. The characteristics of the course of pneumonia in children with childhood cerebral insufficiency are due to: 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. Due to the lack of information on the specifics of managing young children in critical condition, an attempt was made to assess the impact of mechanical respiratory support on the circadian rhythm of the respiratory center in complicated infectious diseases of young children based on the study of circadian rhythm monitoring data for spontaneous breathing rate [1-5].

Objective of the work. To study and assess the impact of acute cerebral insufficiency on the circadian rhythm of spontaneous breathing rate in complicated infectious diseases of young children.

Material and methods of the study. The results of continuous prolonged monitoring with hourly recording of body temperature, hemodynamic parameters, and respiration were studied in children admitted to the ICU of the RRCEM in a critical condition due to infection complicated by acute cerebral and respiratory failure at the age of 5.5 months to 2.5 years. Group 1 included 8 children aged 12.6 ± 5.5 months who, upon admission to the clinic and throughout intensive care, had no indications for mechanical respiratory support, which did not exclude oxygen therapy without mechanical ventilation. 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 inhibition of brain function by 29%, which determined the duration of MCI, the duration of intensive care in the ICU and in the hospital as a whole. Severe pneumonia was detected in children (100%) of group 2. The peculiarity of patients in group 2 was concomitant chronic neurological diseases, such as Aicardi syndrome, floppy child syndrome (26%), as well as acute severe hypoxic brain injury caused by complications of a burn of the oropharynx (12%), a foreign body in the respiratory tract (12%), acute severe pneumonia with ARF grade 3 (50%). Mechanical ventilation was performed in the AC, CMV, IPPV, SIMV modes; as breathing was restored, MCI was continued in the CPAP, BIPAP modes. The choice of MRP was carried out in accordance with modern recommendations set out in Republican and international standards and clinical protocols.

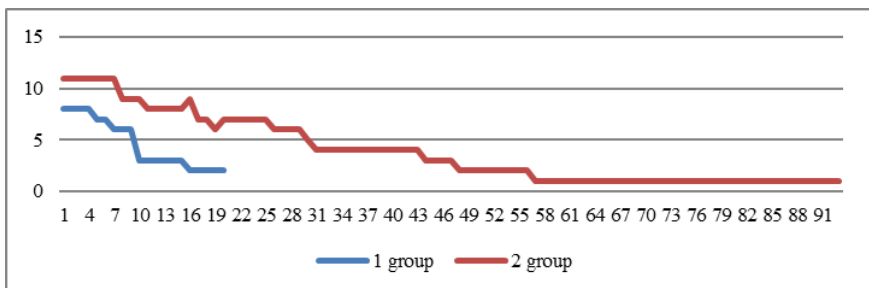


Figure 1. Duration of intensive care in the ICU.

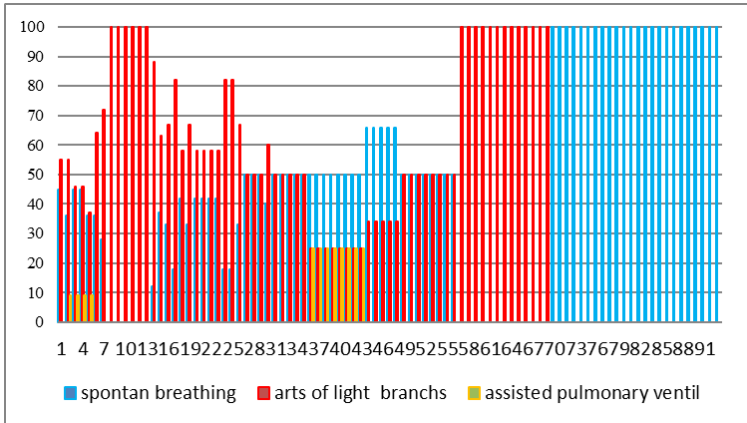


Figure 2. Mechanical respiratory support in %.

Table 1.

Average values of the phase structure of the circadian rhythm of respiratory rate

Groups	Mesor	In acrophase	In the bathyphase	Amplitude	Daily range
1	31±1,5	33±1,7	28±1,8	3±1,1	5±1,8
2 gr. 20 days	29±18	33±20	26±16	5±3	7±5
2 gr. 93 days	31,6±5,7	27,9±6,6	5,9±5,9	8,4±5,1	17,0±4,5

Table 2.

Measuring circadian rhythm in RR per minute.

Days	1 group	2 group
1	36±4	45±3*
2	31±1	39±1*
3	31±1	40±2*
4	32±1	34±5
5	32±1	34±3
6	31±1	36±1*
7	31±1	35±1*
8	32±1	0
9	31±2	0
10	28±1'''	0
11	22±1'''	0
12	30±1'''	0
13	30±1'''	0

14	28±2 ^m	48±8*
15	31±1	40±3*
16	29±2	40±1*
17	31±1	50±2*
18	31±1	48±2*
19	31±1	51±2*
20	32±1	47±2*

Table 3.

Average circadian rhythm in RR per minute.

Hours	1 group	2 gr 20 days	2 gr 93 days
8	32±2	31±19	33±7
9	31±2	30±19	32±6
10	32±2	29±18	31±6
11	31±2	29±18	32±6
12	31±2	29±18	32±6
13	31±2	29±18	32±6
14	31±2	29±18	32±6
15	31±2	29±18	31±7
16	30±1	29±18	31±6
17	30±2	30±18	32±6
18	30±2	29±17	32±6
19	31±2	30±18	32±6
20	30±2	29±17	31±6
21	30±2	27±19	31±6
22	30±2	28±19	32±6
23	30±2	31±18	31±6
24	30±2	29±18	31±6
1	30±2	29±18	31±6
2	30±2	29±17	31±6
3	30±2	29±18	31±6
4	30±2	29±18	32±6
5	30±2	29±18	32±6
6	30±2	29±18	32±6
7	30±2	29±18	32±6

*- the difference is reliable relative to the indicator in group 1

On the first day, more pronounced ARF was manifested by an increase in RR by 25% in group 2 relative to the indicator in group 1. In dynamics during the first week of treatment, some tendency towards a decrease in ARF was revealed in both groups. However, in group 2, relative to the indicator in group 1, on days 1-3, 6,

7, the mesomorph of the circadian rhythm of RR was greater by 25%, 26%, 29%, 16%, 13% ($p < 0.05$, respectively). The revealed tendency towards a decrease in the mesomorph of the circadian rhythm of RR in group 1, which became a reliable significant sign of a decrease in ARF on days 10-14 by 22%, 38%, 16%, 16%, 22% ($p < 0.05$, respectively), corresponded to the effectiveness of the intensive therapy. While in children of group 2 on the 8-13th day there was a need for MRP, due to more severe progressive ARF (Table 2). Even at later stages, restored spontaneous breathing indicated more pronounced ARF in children of group 2 relative to patients of group 1 at the same time. The increase in the mesoscopic circadian rhythm of respiratory rate on the 14-20th day in children of group 2 after restoration of independent breathing was 71%, 29%, 37%, 61%, 54%, 96%, 46% ($p < 0.05$, respectively).

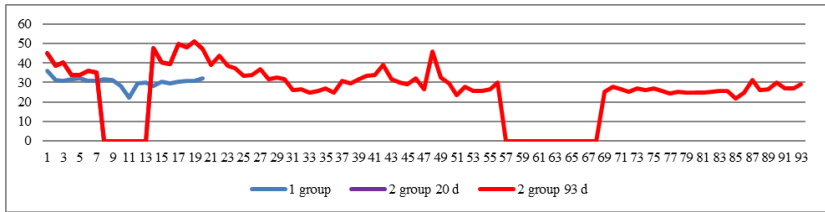


Figure 3. Dynamics of the circadian rhythm mesorum RR, breaths per minute.

Almost all 11 patients of the 2nd group were on artificial ventilation on days 8–13. At a later date (days 56–70), artificial ventilation was performed for a child with acute renal failure, whose complex intensive therapy included extracorporeal detoxification methods (Fig. 3).

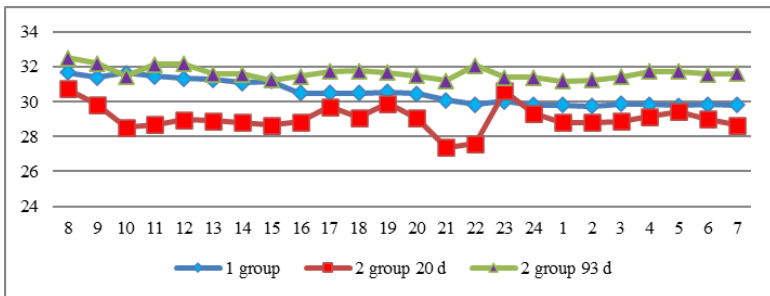


Figure 4. Average circadian rhythm of respiratory rate per minute.

In the first 20 days of intensive care, the average circadian rhythm of respiratory rate of children in Group 2 was noted at a slightly lower level than in Group 1. Higher values of the average circadian rhythm of respiratory rate over 93 days

are due to the persistence of ARF after the restoration of spontaneous breathing and cessation of mechanical ventilation (Fig. 4). The dynamics of the amplitude of the circadian rhythm of respiratory rate corresponded to the clinical signs of the severity of ARF.

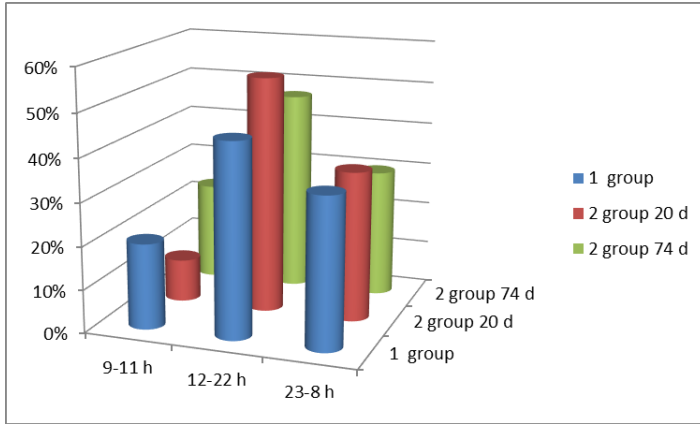


Figure 5. Duration of circadian rhythm inversion of respiratory rate

Analysis of the percentage of duration of stay in the intensive care unit revealed no significant differences in the duration of circadian rhythm inversion of RR by groups (Fig. 5).

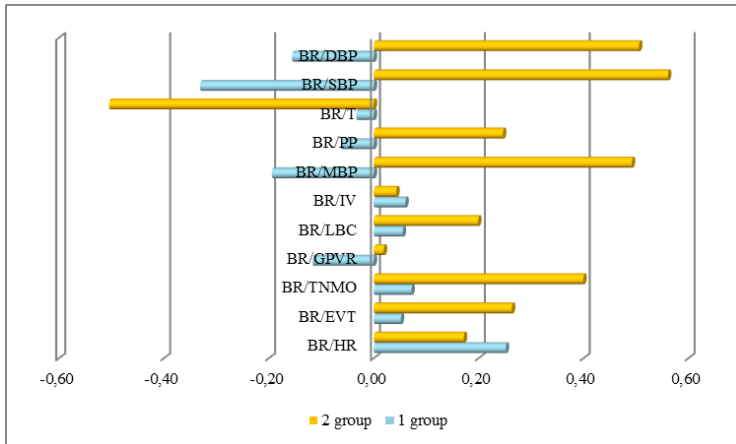


Figure 6. Correlation relationships of the circadian rhythm mesor of the respiratory rate

In group 2, a tendency was revealed for a direct relationship (0.4) between the myocardial oxygen demand, SBP (0.56), DBP (0.51), the level of MAP (0.49) and an inverse relationship between body temperature (-0.5) and the respiratory rate (Fig. 6).

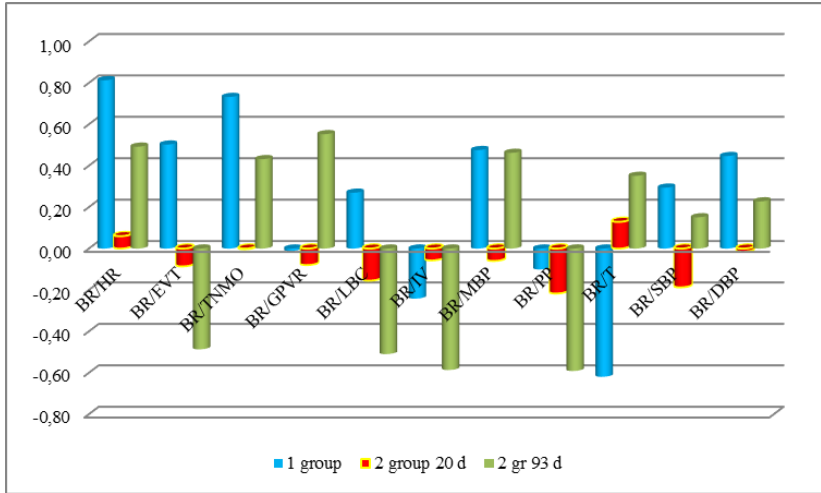


Figure 7. Correlation relationships of the average circadian rhythm of respiratory rate.

The study of the correlation relationships of the average circadian rhythm of respiratory rate allowed us to establish more significant compensatory mechanisms in group 1. Thus, an increase in respiratory rate occurred with more pronounced tachycardia (0.81), an increase in MVP (0.73), while only the breathing restored after prolonged mechanical ventilation in group 2 revealed a tendency to increase in breathing with an increase in heart rate (0.49), an increase in MVP (0.43), an increase in TPR (0.55), a decrease in MVB (-0.51), SV (-0.59), and PBP (-0.59). The latter characterizes a compensatory increase in the work of external respiration when signs of heart failure appear (Fig. 7).

Conclusion. On the first day, more pronounced ARF was manifested by an increase in respiratory rate by 25% in group 2 relative to the indicator in group 1. In children of group 2, on days 8–13, there was a need for MRP due to more severe progressive ARF. Even at later stages, restored spontaneous breathing indicated more pronounced ARF in children of group 2 relative to patients of group 1. The study of correlations of the average circadian rhythm of respiratory rate allowed us to establish more significant compensatory mechanisms in group 1. In children of

group 2, a tendency was revealed to increase the work of external respiration with a decrease in cardiac output and stroke volume.

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老年女性骨关节炎炎症标志物检测的临床意义
**CLINICAL SIGNIFICANCE OF MARKERS OF INFLAMING IN
ELDERLY WOMEN WITH OSTEOARTHRITIS**

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摘要。骨关节炎(OA)是一种退行性关节疾病,发生在软骨被破坏时。女性患OA的风险高于男性。细胞老化、血液中炎症介质水平升高和氧化应激是OA发展的重要年龄相关因素。该研究的目的是评估全身炎症指标对膝关节骨关节炎老年女性的临床意义。这项同步开放标签研究包括38名膝关节OA患者(平均年龄 70 ± 2 岁),对照组由32名年龄相当且无骨科疾病的女性组成。结果发现,膝关节OA老年女性患者的IL-1 β (高28.2%, $p<0.01$)、MCP-1(高32.5%, $p<0.01$)、全身炎症中性粒细胞/淋巴细胞指数(NLR)(36.1%, $p<0.01$)、单核细胞/淋巴细胞(MLR)(34.6%, $p<0.01$)、血小板/淋巴细胞(PLR)(14.0% ($p<0.05$))均显著升高。相关性分析显示,IL-1 β 与NLR($p=0.023$)、MLR($p=0.017$)、PLR($p=0.039$)呈正相关;MSR-1水平与NLR($p=0.024$)、MLR($p=0.036$)呈正相关。膝关节骨关节炎患者的全身炎症发生率较高,并且炎症因子与炎症反应之间存在密切的关系。研究组患者的IL-1 β 、MCP-1水平及炎症指标。

关键词: 老年; 炎症; 骨关节炎。

Abstract. Osteoarthritis (OA) is a degenerative joint disease that occurs when cartilage is destroyed. Women have a higher risk of developing OA than men. Cellular aging, increased levels of inflammatory mediators in the blood, and oxidative stress are important age-associated factors in the development of OA. The aim of the work was to evaluate the clinical significance of indicators of systemic inflammation in elderly women with osteoarthritis of the knee joint. The simultaneous open-label study included 38 patients (average age 70 ± 2 years) with knee joint OA, the comparison group consisted of 32 women of comparable age without orthopedic diseases. It was found that elderly women with knee joint OA had significantly higher indices of IL-1 β (by 28.2%, $p < 0.01$), MCP-1 (by 32.5%, $p < 0.01$), systemic inflammatory neutrophil/lymphocyte indices (NLR) (36.1%, $p < 0.01$), monocytes/lymphocytes (MLR) (34.6%, $p < 0.01$), platelets/lymphocytes (PLR) (14.0% ($p < 0.05$)). Correlation analysis revealed a positive association of IL-1 β with NLR ($p = 0.023$), with MLR ($p = 0.017$), PLR ($p = 0.039$); the level of MSR-1 with NLR ($p = 0.024$), MLR ($p = 0.036$). osteoarthritis of the knee joint have higher rates of systemic inflammation and a close relationship was established between the level of IL-1 β , MCP-1 and the indicators of inflaming in the studied group of patients.

Keywords: old age; inflaming; osteoarthritis.

Relevance Osteoarthritis (OA) is the most common degenerative joint disease that occurs when cartilage breaks down, leading to pain, swelling, and stiffness. Women have a higher risk of developing OA compared to men.[1]. OA most often affects joints that bear increased loads - the knees and hips, and is usually asymmetrical. According to statistics, among women over 65 years of age, about 35% of patients suffer from osteoarthritis of the knee joint [2]. With age, the bone matrix becomes less strong and flexible, as its destruction by osteoclasts occurs faster than its formation by osteoblasts [3]. Age-associated factors that play an important role in the development of OA are cellular aging, increased levels of inflammatory mediators in the blood, and oxidative stress. In addition, in old age, the development of OA is facilitated by a decrease in muscle mass and an increase in fat mass, leading to a change in the load on the joint, increased production of adipokines and cytokines, which entails low-grade systemic inflammation (inflammation), changes in the extracellular matrix, including the accumulation of advanced glycation end products, a decrease in the size of aggrecan, decreased hydration, and increased collagen breakdown [4]. Thus, there is a change in the mechanical properties of the cartilage, which makes it more susceptible to degeneration.

Previous studies have proven the significant role of immune inflammation in the pathogenesis of OA. Thus, to date, the role of interleukin -1 β (IL-1 β) as an indicator of cartilage degradation in OA has been studied, since it is precisely this

that contributes to a decrease in the synthesis of type II collagen, an important component of cartilage [5]. Another well-studied cytokine involved in pathological processes in OA is tumor necrosis factor alpha (TNF- α), the increased concentration of which is determined in the same tissues as IL-1 β - synovial fluid, cartilage, subchondral bone layer. At the same time, routine practice requires simple noninvasive markers of inflammation that have proven their prognostic value in systemic diseases. The ratio of neutrophils and lymphocytes (NLR), monocytes and lymphocytes (MLR), and platelets and lymphocytes (PLR) in the blood are currently used as such markers, but their clinical significance in OA in elderly women has not been fully studied [6].

Purpose of the work– to evaluate the clinical significance of systemic inflammation indices in elderly women with knee osteoarthritis.

Material and research methods. A cross-sectional, open-label study (September – December 2023) included 38 patients with knee OA. The average age was 70 \pm 2 years. The diagnosis of OA was made in accordance with clinical guidelines on the diagnosis and treatment of primary osteoarthritis (2022).

Inclusion criteria: Women elderly according to WHO criteria (60-74 years old), diagnosed with osteoarthritis of the knee joint (OA) 2 stages according to Kellgren - Lawrence [7] for at least one year, as confirmed by the patient’s medical history/outpatient card. In the comparison group included 32 age-matched female patients without orthopedic diseases.

Exclusion criteria: Cognitive impairment, severe somatic diseases (COPD, CHF, CKD, liver cirrhosis), oncopathology.

All patients underwent a general blood test with determination of the leukocyte formula using the standard method. The level of IL-1 β and MCP-1 in the blood was determined using the enzyme immunoassay method using a set of reagents for enzyme immunoassay determination from Vector-Best CJSC (Russia).

For statistical processing we used program STATISTICA 10.0. Quantitative variables are presented as Me (Q25%, Q75%), continuous - M \pm SD (M is the mean value, SD is the standard deviation). Qualitative variables are presented as frequency of occurrence (%). Conducted to Spearman correlation analysis. The results of statistical analysis were considered significant at p<0.05.

Research results. Clinical and demographic results are presented in Table 1.

Table 1

Main clinical and demographic characteristics of the studied patient groups

Indicator, units of measurement	Group 1 (n=38)	Group 2 (n=32)
Age, years(M \pm SD)	70.0 \pm 2.0	68.0 \pm 3.0
Body mass index, kg/m ²	33.6* (31.3; 37.6)	28.5 (23.8; 32.5)
OT, cm	115.9* (101.7; 120.8)	103.1 (86.2; 110.8)

Heart rate, bpm(M±SD)	76.0±5.0*	68.0±4.0
Ischemic heart disease, people (%)	2 (5.3)	0
History of arterial hypertension, people (%)	30 (78.9)	24 (75.0)
Arterial hypertension stage I, persons (%)	12 (40)	22*** (91.7)
Arterial hypertension stage II, persons (%)	18*** (60)	2 (8.3)0
CHF I-II FC according to NYHA	3 (7.9)	1 (3.1)
Burdened heredity for OA, people (%)	16** (42.1)	2 (6.3)
Diabetes mellitus type 2, people (%)	8* (21.1)	4 (12.5)
Chronic kidney disease, people (%)	7* (18.4)	4 (12.5)

Note: * p<0.05; ** p<0.01; *** p<0.001 – between groups 1 and 2

When assessing the clinical and demographic data, it was found that women with knee OA, compared to the comparison group, had a higher BMI (15.2%, p<0.05), WC (11.0%, p<0.05), heart rate (10.5%, p<0.05), with a comparable incidence of arterial hypertension, they had a higher degree (52.7%, p<0.001), type 2 diabetes mellitus (8.6%, p<0.05), and a burdened heredity for OA (35.8%, p<0.01).

The study found that in 1group levelIL-1β was 105.7 (87.4; 172.6), in group 2 – 75.9 (59.7; 94.1) pg/ml (28.2%, p<0.01), the level of MCP-1 in group 1 was70.2 (44.2; 87.8), in group 2 - 47.4 (35.1; 56.5) pg./ml (32.5%, p<0.01).

According to literature data, in systemic inflammation not only the number of formed elements of the blood changes, but also the ratio between different forms of leukocytes (monocytes/lymphocytes, neutrophils/lymphocytes), as well as platelets and lymphocytes [8]. In our study, the NLR index (neutrophil/lymphocyte ratio) in the first group it was 2.3 (1.6; 2.6), in the second 3.6 (2.8; 4.4) relative units, (36.1%, p<0.01), MLR (monocytes/lymphocytes) 0.52 (0.42; 0.58) and 0.34 (0.22; 0.45), respectively (34.6%, p<0.01). Index PLR (platelets/lymphocytes) in group 1 -166.9 (141.3; 238.5), in group 2 -143.5 (113.4; 220.5) relative units, the difference between the groups was 14.0% (p<0.05). At k Correlation analysis revealed a positive relationship between IL-1β and NLR (r=0.395, p=0.023), MLR (r=0.413, p=0.017), PLR (r=0.317, p=0.039); MCP-1 level with NLR (r=0.384, p=0.024), MLR (r=0.302, p=0.036). Univariate analysis of the odds ratio showed a significant relationship with OA of the MLR (p=0.021), NLR (p=0.023) indices, and the leptin level with the MLR (p=0.042) and NLR (p=0.039) index.

Conclusion Thus, our study demonstrated that elderly women with knee osteoarthritis have higher rates of systemic inflammation and a close relationship was established between the level of IL-1 β, MCP-1 and inflammation indices in the studied group of patients.

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胎儿胎盘功能不全的血流动力学参数特点
**FEATURES OF HEMODYNAMIC PARAMETERS IN
FETOPLACENTAL INSUFFICIENCY**

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摘要。胎盘复合体血流动力学参数的变化是母亲和胎儿许多病理状况的反映。它们先于病理过程的临床表现，成为妊娠不良过程和结果的早期标志。对137名儿童的胎盘血流动力学产前指标的分析表明，在存在胎盘功能不全（FPI）的情况下，子宫动脉、脐带动脉的血管阻力指数增加，血流舒张成分减少。在大脑中动脉（MCA）中，本组患者的脉动指数（PI）降低，收缩期血流速率增加。研究发现，在有FPI病史的情况下，体重和身高不足且宫内感染（IUI）的儿童出生率明显较高。

关键词：胎盘功能不全、血流动力学、多普勒测量、新生儿。

Abstract. *Changes in hemodynamic parameters in the fetoplacental complex are a reflection of many pathological conditions on the part of the mother and fetus. They precede the clinical manifestation of the pathological process and become an early marker of the unfavorable course and outcomes of gestation. Analysis of prenatal indicators of fetoplacental hemodynamics in 137 children revealed an increase in the vascular resistance index with a decrease in the diastolic component of blood flow in the uterine arteries, umbilical cord arteries in the presence of fetoplacental insufficiency (FPI). In the middle cerebral artery (MCA), patients in this group showed a decrease in the pulsatile index (PI) and an increase in the systolic blood flow rate. It was found that the birth rate of*

children with body weight and height deficiency for a given gestational age and intrauterine infection (IUI) is significantly higher in the presence of a history of FPI.

Keywords: *fetoplacental insufficiency, hemodynamics, dopplerometry, newborn.*

According to modern studies, more than 60% of the pathology of newborns and children in the first months of life occurs in the perinatal period, and one of the main causes of its development is placental insufficiency - a clinical syndrome due to morpho-functional changes in the placenta and violation of its compensatory and adaptive mechanisms [1, 2].

One of the necessary conditions for adequate antenatal development of a child is the optimal state of the fetoplacental complex, which performs a variety of functions, such as trophic, excretory, barrier, endocrine, protein-synthetic, immunoregulating. Many functions of the fetoplacental complex ensure growth and support the vital activity of the fetus, determining the outcome of pregnancy. Infectious damage to the placenta, microthrombus formation in the capillary network due to both the infectious process and thrombophilic conditions significantly reduce the speed and volume indicators of fetoplacental blood flow. Morphologically, with hematogenous dissemination of infection in the placenta, villusitis and deciduitis are visualized with further spread of the infectious process to the chorial plate and amniotic membrane, and with an ascending type of infection, chorioamnionitis and intervillitis develop at the initial stages. Thrombophilic conditions in a pregnant woman lead to disseminated microthrombus formation with pronounced circulatory changes in the mother-placenta-fetus system. Thus, the change in hemodynamic parameters in the fetoplacental complex is a reflection of many pathological conditions on the part of the mother and fetus. They precede the clinical manifestation of the pathological process and become an early marker of the unfavorable course and outcomes of gestation [3, 4, 5]. Changes in indicators of fetal-placental blood flow - there are nonspecific manifestations of compensatory-adaptive reactions of the fetus. The most characteristic of FPI, including in IUI, is an increase in the resistance index of the blood flow of the umbilical artery and the pulsatile index of the middle cerebral artery. In general, there is a decrease in the final diastolic blood flow rate, as a consequence of a significant increase in peripheral vascular resistance of the fruiting part of the placenta and an increase in vascular resistance indices [6, 7, 8].

One of the important indicators in the diagnosis of fetal FPI and anemia is the assessment of dopplerometry in the MCA. Against the background of hypoxia, perfusion through the cerebral arteries increases, providing adequate blood flow to the brain (centralization of blood flow) - the effect of "brain-sparing effect"

- the speed of blood flow increases. The pulsation index (PI) is low. In fetuses with growth retardation, a pulsatile index below the normal range indicates an increased risk of adverse perinatal outcome. The progressive increase in dysfunctions of the fetoplacental complex is potentially dangerous, since, in addition to long-term postnatal disorders, it can lead to antenatal death of the child, which makes it necessary to conduct dynamic Doppler monitoring for timely verification of dangerous changes in hemodynamics. For example, the disappearance of the “brain preservation” effect is indicative of a critical condition of the fetus and usually precedes antenatal death [5, 9].

The aim of the work is – to conduct a comparative analysis of the features of hemodynamics in the fetoplacental complex in the presence and absence of fetoplacental insufficiency.

Materials and methods

The study included retrospective data on prenatal Doppler parameters in mothers of 137 children. The maximum systolic and minimum diastolic blood flow rate, systolic-diastolic ratio and resistance index in uterine arteries, umbilical cord arteries and MCA were evaluated, followed by an analysis of perinatal outcomes. Abnormalities in fetoplacental blood flow were classified into three grades: grade I (compensated), which is subdivided into: IA - abnormality of the blood flow velocity curve (FVC) in uterine arteries with normal FVC in umbilical arteries and IB - abnormality of FVC in umbilical arteries with normal FVC in uterine arteries; II degree (subcompensated) - simultaneous violation of FVC in the uterine arteries and umbilical cord arteries, but not reaching critical changes, i.e. the final diastolic blood flow is preserved; Grade III (decompensated) - critical disorders of FVC in the umbilical cord arteries (zero or reverse diastolic component) with preserved or impaired uteroplacental blood flow. Doppler measurements of fetoplacental blood flow evaluated the following parameters: 1. Systolodiastolic ratio (SDR) - ratio of maximum systolic to final diastolic blood flow rate S/D ; 2. The pulsatile index (PI) is expressed by the ratio of the difference between the maximum systolic and final diastolic velocities to the average velocity $(S-D)/(V_{average})$; 3. The resistance index (RI) is determined by the ratio of the difference between the maximum systolic and final diastolic velocity to the maximum systolic blood flow velocity $(S-D)/S$. Statistical processing of the study results was carried out using the Statistica 15 for Windows program (Stat Soft). Differences between the compared values at $p < 0.05$ were considered statistically significant.

Results and its discussion

In the study population, FPI occurred in 62% (85 women). Of these, compensated FPI was 50.6% (43), subcompensated - 36.5% (31), decompensated - 12.9% (11). With compensated FPI, there was an increase in the vascular resistance index with a decrease in the diastolic component of blood flow in the uterine arteries, the

umbilical cord arteries (with an increase in the resistance index (RI) to 0.96 and the SDR to 2.68 ± 0.47 and MCA (a decrease in PI and an increase in the maximum systolic blood flow rate for this gestational range) with an increase in these changes with subcompensated FPI. Subcompensated FPI showed an increase in vascular resistance with a decrease in the diastolic component of blood flow. In the case of decompensated FPI, a sharp decrease in the maximum systolic and minimum diastolic blood flow rate was noted with a significant increase in the resistance index (Table 1).

Table 1
Uterine doppler parameters by severity of fetoplacental hemodynamic disorders in the study population

Doppler parameter	Max Systolic blood flow rate*	Min Diastolic blood flow rate *	SDR*	RI*
Compensated FPI (n=43)	55,2±0,54	24,1±0,49	2,37±0,048	0,56
Subcompensated FPI (n=31)	48,9±0,59	21,3±0,57	2,48±0,057	0,61
Decompensated FPI (n=11)	46,5±0,47	17,1±0,47	2,61±0,056	0,65

Note: $p \leq 0.05$ when comparing all cases

It was found that the birth rate of children with body weight and height deficiency for a given gestational age with no history of FPI (n = 52) was 15.4% (8), which was significantly lower than in children with a history of FPI (n = 52): 83.7% (36) with compensated FPI and 100% with subcompensated and decompensated FPI. An interesting and pathogenetically substantiated fact was the identification of a high frequency of the association of FPI and VUI: the severity of FPI increased as the incidence of VUI increased. So, with FPI I degree occurred in 51.2% of cases, with FPI II degree - in 71% of cases, and with FPI III degree - in 100% of cases.

Conclusion. According to the results of the study, in FPI, hemodynamic changes were observed with an increase in the vascular resistance index and a decrease in the diastolic component of blood flow in the uterine arteries and umbilical cord arteries.

In MCA, an increase in the maximum systolic blood flow rate and a decrease in the pulsatile index were noted as an adaptive reaction.

In children with a history of FPI, body weight and height deficiency for a given gestational age and intrauterine infection were significantly more common (which may indicate a significant role of IUI in the pathogenesis of FPI).

A higher incidence of children with body weight and height deficiency for a given gestational age with a history of FPI suggests a significant role of dysfunctions in the fetoplacental complex and antenatal nutritional deficiency in disrupting prenatal growth and functional maturation, which can disrupt neonatal adaptation and contribute to the development of chronic pathology.

Given the high level of clinical informativity, the assessment of prenatal Doppler parameters will make it possible to objectively assess the condition of the fetus and predict perinatal outcomes.

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古代伊朗的建筑特色, 得益于独特的水利建筑体系

THE ARCHITECTURAL FEATURES OF ANCIENT IRAN, DUE TO THE UNIQUE SYSTEM OF HYDRAULIC STRUCTURES

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摘要。本文探讨了伊朗独特的供水系统所决定的建筑和景观环境的特点, 该系统确保人类能够适应缺水地区的恶劣气候条件。

关键词: 绳索(坎里兹)系统, 伊朗水工建筑。

Abstract. *The article considers the features of the architectural and landscape environment determined by the unique water supply system of Iran, which ensures human adaptation to difficult climatic conditions in regions with water shortages.*

Keywords: *ropes (kariz) system, hydraulic structures of Iran.*

The history of human civilization is the history of creation and improvement, but also survival and adaptation to environmental conditions. The weaker the means of protection from the external environment, the more favorable the conditions of existence should be. But man would not remain who he is if he did not try to see and develop new lands and territories. The history of architecture can be viewed through the prism of the adaptation of peoples to existence in various climatic, political, economic conditions, which determine the introduction of new technological, aesthetic solutions to improve the comfort and safety of human life. The use of local materials and adapted technologies for the transformation of their homes to improve performance characteristics, taking into account the physical (temperature, humidity, illumination, etc.) and geographical features of the area, is a common practice in the world history of the development of architecture [1,2]. For example, in conditions of extremely low temperatures and permafrost, single-story small-sized dome structures provided people with optimal circulation of warm air, resistance to strong gusts of cold wind and mobility of the residential building [1]. In hot countries, architects tried to ensure maximum opening of the home to the external environment. Single-row two-level planning of buildings with a high degree of cross-ventilation of the premises and correct orientation of

buildings relative to the sun's rays, as well as the design of covered verandas and squares, allowed people to live comfortably in regions with a humid hot climate [2]. Many researchers postulate the idea of the need to take into account historical developments when developing new ideas and planning solutions [1,2].

The aim of the study was to analyze the adaptive construction strategy of a person in regions with a hot climate to determine the leading architectural features of residential buildings and traditional techniques in the construction of houses. The analysis was carried out based on the study of the territories and architectural features of Iran. Modern Iran is located on the territory of ancient Persia, whose culture was largely borrowed from the Mesopotamian states of Sumer, Babylonia and Assyria. The traditions and history of Persia are largely the legacy of Mesopotamia. Most of Iran's territory is occupied by waterless deserts with an arid climate, where annual precipitation does not exceed 250 mm per year, rains fall from October to April, and rivers are mainly located in the north of the country. A large arid territory with pronounced seasonality of precipitation could not be populated without a well-organized water supply system. And people came up with a very non-standard solution, developing an underground hydrotechnical network of karizes/qanats, which stretches for hundreds of kilometers under the deserts of Iran. Water flowing through qanats from a source in the mountains to a consumer in the desert is used for drinking water supply, irrigation and providing water to cattle. The peculiarity of the territories is the arid climate, the absence of groundwater close to the surface, the need to deliver water from distant sources (from high-mountain areas) and the impossibility of using open channels due to the high coefficient of liquid evaporation [3,4,5]. The system built by the ancient Persians is both simple and ingenious, so it began to be used in many countries with a similar climate and has been used for thousands of years. From high-mountain areas saturated with water, multi-kilometer canals go at a minimal slope, delivering water to arid regions (Fig. 1). The network of ropes is so intricate and complex that sometimes they had to be laid in several levels.

In order to lay a new kariz, survey work was carried out. The chief master - karizgen, who had 3 to 5 people under his command, checked the soil for the presence of plants with a developed root system indicating the presence of groundwater, determined the required depth of the well and directly supervised the construction of the kariz. If the search for a source of groundwater was successful, they began to build a qanat. In order to dig an underground tunnel without using machinery, ancient builders had to dig inspection wells every 15-20 meters along the qanat. Qanats could stretch to a populated area at a distance of up to 40 km from the aquifer. Researchers believe that without the invention of qanats, a large number of cities in Iran simply could not have appeared and existed. A similar water supply system is relevant to this day. For example, the city of Ganabad,

which has a population of 35 thousand people, still receives water supply from the Ganabad kariz. But in addition to the problem of water delivery, there were difficulties with storing and cooling water and premises. Thus, it was the features of hydraulic structures that became an important factor in the formation of the architectural style of cities and housing (Fig. 2).

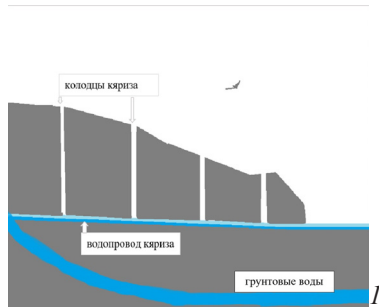


Figure 1. Sectional view of a traditional qanat

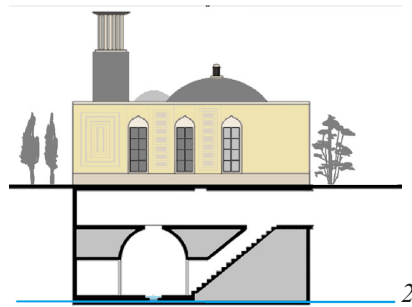


Figure 2. Residential building in section

The location of the kariz largely determined the layout of the city, houses were built along the qanat. From the main channel, water was supplied to the underground levels of residential buildings, where there were cooling rest rooms. The temperature in such rooms was almost 10°C lower than the outside temperature. In addition, badgirs were used to cool and ventilate the rooms, they caught wind flows and directed them to the basement, where the air was cooled and saturated with moisture due to the underground source, then the flow was directed to the living quarters, and then blown out through separate pipes. Water from the kariz was supplied to traditional water storage facilities, they are called sardobs or ab-anbars and consisted of a khazina (cistern), a dome and a badgir. The khazina was located underground to receive the water coming from the qanat and maintain a low water temperature. Badgirs provided air circulation to prevent water from rotting, their number could vary from 1 to 6 towers. The main building material of the sardoba was limestone, ash and sand, their solution created additional waterproofing and prevented water from rotting. Not far from the cities, yakhchals were built, which were an ancient type of evaporative cooler, they were able to store and produce ice. To build a yakhchal, a hole of up to 5000 m³ was dug, and a dome of adobe brick was erected on top. The height of the dome could reach 18 m, a special solution of sarudzh was used to strengthen it, consisting of clay, ash, sand, egg yolk and lime. The walls of the dome were more than 2 meters thick at the base and tapered towards the top, where there was an opening for the removal of hot air. Badgirs helped direct the desert wind to the source of cold water, which was sup-

plied by a rope. When hot dry air collided with cold water, the water transitioned into steam, which was the reason for the cooling process.

Thus, it was the need to supply water, preserve its properties for a long time and cool the premises that were the cornerstone in planning streets and buildings and, consequently, influenced the architectural and landscape environment. This helped people to ensure acceptable living conditions in difficult climatic conditions and to use water for household needs and irrigation of lands as wisely as possible. The anthropogenic landscape of Iran with the domes of cooling towers and underground reservoirs accompanying the hydraulic system of canals has been preserved to this day and will be in demand for a long time, since water is the main component of life in this region.

Of course, in the modern world, the features of architectural styles, determined by the climatic, national, religious and cultural characteristics of the architects, are gradually being leveled. Technological development gives architects the opportunity to provide comfort and coziness to homes through the use of electricity, sunlight, atoms, etc. However, studying traditional construction technologies undoubtedly helps to use the wisdom of our ancestors and integrate the accumulated experience of centuries and new technologies to ensure a synergistic effect in planning and construction.

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