ACTUAL PROBLEMS OF MODERN SCIENCE, EDUCATION AND TRAINING

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CONTENTS

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THE ROLE OF TOUR GUIDES IN FORMING DESTINATION BRANDING OF HERITAGE OBJECTS IN SAMARKAND, UZBEKISTAN

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Annotaciya: Quyidagi maqolada meros/tarixiy madaniy obyektlari brendi va uning Markaziy Osiyodagi eng tarixiy shaharlaridan biri Samarqandda tarixiy madaniy turizmi uchun ahamiyati mavzusidagi muhokama bayon etilgan. Adabiyotlar tahlili Samarqand shahridagi asosiy meros ob'ektlarini pozitsion marketingida ilmiy yondashuv va asoslardan foydalanishni taklif qiladi. Bu, ayniqsa, O‘zbekistonda turizm sohasida jadal rivojlanib borayotgan bir paytda mahalliy aholi o‘rtasida tarixiy xotirani ommalashtirish bilan birga muhim ahamiyat kasb etmoqda. Ilmiy yondashuvni qo'llash natijasida kutilayotgan natijalar ham muhokama qilinadi.

Kalit so'zlar: Tarxiy madaniy meros obyektlari brendingi, turizm Samarqand

Аннотатция: В статье ниже изложен дискурс на тему брендинга дестинаций и его важности для культурно-исторического туризма в одном из самых исторических городов Центральной Азии – Самарканде. В обзоре литературы предлагается использовать научный подход и структуру для дестинационного брендинга основных объектов наследия Самарканда. Это особенно важно в период бурного роста туристического сектора в Узбекистане наряду с популяризацией изучения наследия среди местного населения. Также обсуждается ожидаемая польза от применения научного подхода.

Ключевые слова: Брендинг дестинации, наследие, исторический туризм, Самарканд.

Abstract: This article below explores the significant role of tour guides as one of the key stakeholders in shaping the destination branding of heritage objects. The discourse is applied for the case of Samarkand, a city renowned for its rich history and cultural significance in Central Asia. Through a review of literature and use of research methods the study highlights how tour guides act as cultural interpreters and storytellers, influencing tourists' perceptions and experiences of heritage sites in Samarkand. The importance of narratives conveyed by tour guides is emphasized. By providing insights into the role of tour guides in destination branding, this article contributes to the understanding of how key stakeholders such as tour guides impact the given parameter.

Keywords: Destination branding, tour guides, heritage, tourism, Samarkand

Introduction. Heritage tourism has become an increasingly popular form of travel, attracting millions of visitors to explore historical sites, monuments, and artifacts around the world. Many countries are emphasizing their heritage objects in the tourism marketing strategies to boost sector’s growth, and Uzbekistan is one of them. Samarkand, located in Uzbekistan, is a UNESCO World Heritage site known for its architectural marvels and historical significance some of which are dating back to nearly 3000 years. As a popular destination for heritage tourism, the role of tour guides in shaping visitors' perceptions and understanding of Samarkand's heritage objects cannot be underestimated. The discourse below outlines the importance of tour guides as cultural mediators in the parameter of destination branding.

Literature Review:

To from it is essential to revisit the term of destination branding. Cai (2002) defines the image of a brand as ‘‘perceptions about the place as reflected by the associations held in tourist memory”. He differentiates between image formation and destination branding. Cai also comments that image building is essential but “there still remains a critical missing link: the brand identity, which needs to be fully established.” Kumar & Kaushik, (2017) write that while destination marketing focuses on promoting the location itself and the experiences that visitors can have there, branding is concerned

with creating a distinctive and recognizable identity that reflects the destination's unique points. Tourists perceive a destination brand not only with its physical features but also with the perspective of social facts and emotional values it reflects (Kumar & Kaushik, 2017).

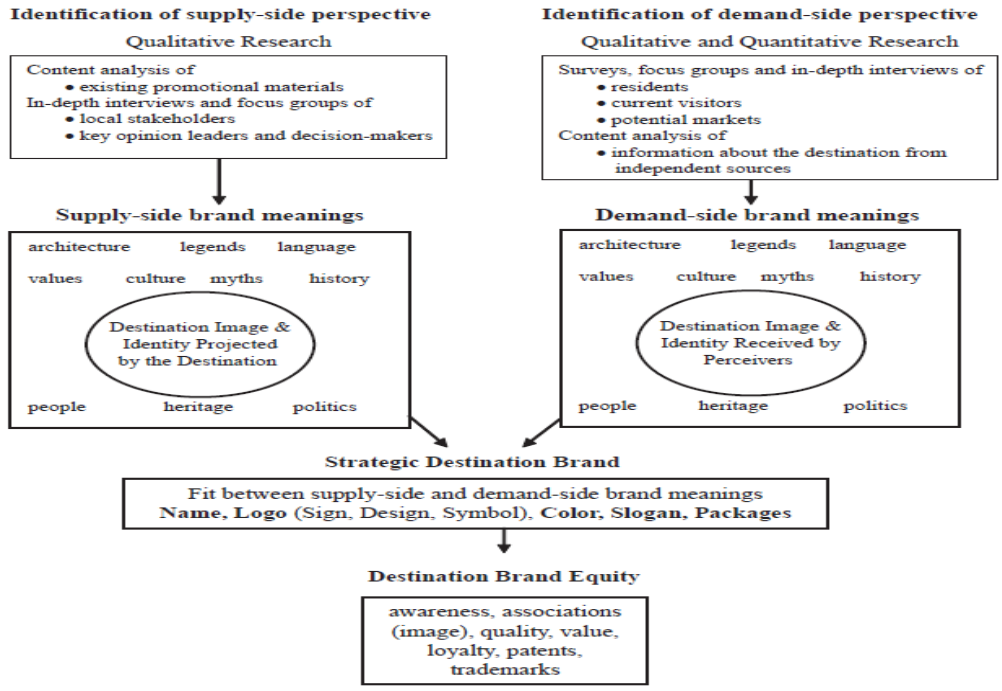

Figure 1. Comprehensive Framework for Creating Strategic Destination Brand (Tasci A. & Gartner W, 2009)

In general it is complex to distill a singular practical framework for destination branding as the concept of it is still quite complex with each destination possessing unique factors impacting its individuality. The framework which has been found to be of a fit for the given proposal addressing its current objectives is by Tasci A. and Gartner W, (2020) which the authors refer to as a practical framework for destination branding (Figure 1) One of the components above to be researched per the Figure 1 above is supply-side perspective which includes local stakeholders, among which are the tour guides. The tour guides serve as cultural mediators who provide valuable insights into the history, significance, and stories behind the city's iconic landmarks, contributing to the destination branding (Liu et al, 2021). Research has shown that tour guides can significantly impact tourists' perceptions and satisfaction levels, influencing their overall experience and likelihood of returning or recommending the destination to others (Kamel, 2021) Through their narratives and interpretations, tour guides shape the destination branding of heritage objects by conveying a sense of authenticity, uniqueness, and cultural richness.

Understanding multifaceted role of tour guides in forming destination branding of heritage objects in Samarkand is essential along with investigating on which literature and narrative stories are used as the main sources in the formation of the tours by the holders of the profession.

Methodology. The researcher had used inductive, qualitative approach techniques in the form of participant as observer and in depth interviews with tour guides. In the city of Samarkand 20 tour guides whose professional experience ranged from 1 year to 20 have been interviewed on the topic of their perception of the heritage objects image and the materials they use to form their tour programs around heritage objects in Samarkand. The tour guides were also surveyed on their top of mind for the main landmark in Samarkand and the visiting guests and their suggestions toward improvement of destination branding. The gender breakdown of interviewees was 9 females to 11 males.

Results and Recommendations. In a short summary, the results presented that in constructing the heritage tours and imagery of the local objects the tour guides mainly rely on the internet sources of local tour agencies such as Advantour, Central Asian Travel, Samarkand tour and others. 6 respondents outlined that they use literature and narratives outlined from Soviet publishers as main archeological works in Samarkand on Timurid's era were conducted during the 1940s and

publications were produced in Russian language. 10 of the Tour guides admitted they do not have sufficient resources available in Uzbek language to draw the heritage narratives from hence mainly use 'google translate' services to interpret the materials from Russian into Uzbek. 12 tour guides agreed that there is a lack of direct destination branding strategy with respect to independent heritage items in Samarkand and more work needs to be done on this from the Tourism authorities.

Conclusion. It became evident that in Samarkand, tour guides at historical sites such as the Registan Square and Shahi-Zinda necropolis play a pivotal role in conveying the city's rich heritage to visitors. Through their knowledge of architecture, history, and local traditions, tour guides enhance tourists' experiences and foster a deeper connection to Samarkand's cultural legacy, hence impacting destination imagery and destination branding. For example, at the Ulughbek Observatory, tour guides provide insights into the astronomical achievements of the Timurid era, creating a sense of wonder and admiration among visitors. These interactions contribute to the destination branding of Samarkand as a must-visit cultural hub with a vibrant historical past.

In conclusion tour guides in Samarkand play a vital role in forming destination branding of heritage objects by providing cultural context, historical insights, and engaging narratives that enhance tourists' experiences. Their ability to convey the significance and value of Samarkand's heritage sites contributes to the authenticity and appeal of the destination, shaping visitors' perceptions and memories. By recognizing the importance of tour guides in heritage tourism in Uzbekistan, creating literature available in multiple languages and up to date literature in Uzbek, Samarkand can leverage their expertise to create compelling narratives, foster sustainable tourism practices, and preserve its cultural heritage for future generations.

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IMPORTANCE OF DESTINATION BRANDING OF MAIN HERITAGE OBJECTS IN SAMARKAND, UZBEKISTAN

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Annotaciya. Quyidagi maqolada ekskursiya gidlarining meros ob'ektlari brendini shakllantirishda asosiy manfaatdor tomonlardan biri sifatidagi muhim roli o'rganiladi. Muhokama Markaziy Osiyoda o'zining boy tarixi va madaniy ahamiyati bilan mashhur bo'lgan Samarqand shahri misolida qo'llaniladi. Adabiyotlarni ko'rib chiqish va ilmiy tadqiqot usullarini qo'llash orqali ekskursiya gidlarining Samarqanddagi meros ob'ektlari haqidagi sayyohlarning tasavvurlari va tajribalariga ta'sir ko'rsatishi muhokama qilinadi. Ekskursiya gidlari tomonidan etkazilgan rivoyatlarning ahamiyati ta'kidlanadi. Ushbu maqola sayohat gidlarining maqsadli brendingdagi roli haqida tushunchalar berib, ekskursiya gidlari kabi asosiy manfaatdor tomonlar ushbu parametrga qanday ta'sir qilishini tushunishga yordam beradi.
Kalit so'zlar: Destinatsiya brendi, ekskursiya gidlari, meros/tarixiy madaniy, turizm, Samarqand
Абстракт. В приведенной ниже статье исследуется значительная роль гидов как одного из ключевых заинтересованных сторон в формировании брендинга объектов наследия. Дискурс применен к Самарканду, городу, известному своей богатой историей и культурным значением в Центральной Азии. Посредством обзора литературы и использования исследовательских методов исследование показывает, как гиды действуют как культурные переводчики и рассказчики, влияя на восприятие и впечатления туристов об объектов культурного наследия в Самарканде. Подчеркивается важность повествований, передаваемых экскурсоводами. Предоставляя представление о роли гидов в брендинге дестинации, эта статья способствует пониманию того, как ключевые заинтересованные стороны, такие как гиды, влияют на данный параметр.
Ключевые слова: Брендинг дестинации, гиды, наследие, туризм, Самарканд.
Abstract. The article below lays out the discourse on the topic of destination branding and its importance for heritage tourism in one of the most historical cities in Central Asia, Samarkand. The literature review proposes to employ the scientific approach and framework toward the destination branding of the main heritage objects in Samarkand. This is especially important at the time of rapid growth of tourism sector in Uzbekistan along with popularizing the heritage studies among local population. The expected benefit of result from the employment of the scientific approach is also discussed.
Keywords: Destination branding, heritage, heritage tourism, Samarkand

Introduction. Located in the heart of Central Asia, Uzbekistan is a country with a deep history and rich culture. It is home to some of the most ancient cities in the world, such as Samarkand, Bukhara and Khiva. Through the ages it has been a crossroad for trade, culture, and ideas. The local culture presents unique blend of influences from Persia, Europe, Russia, China and other parts of the world which has created a distinct identity of our people and location that is worth exploring.

Nevertheless, for many years while being under USSR, Uzbekistan was quite closed for international tourism. In fact it is only under the recent years significant political and economic transformation of the new government in Uzbekistan, the tourism sector has been marked as one of the strategic and most promising sectors in Uzbekistan (International Trade Administration, 2022). In return Uzbekistan's tourism sector has indeed been presenting a significant success in terms of visitor numbers in the last years in Uzbekistan. According to Uzbekistan's Statistics Agency in 2023, first quarter alone 3.1 million foreign citizens visited Uzbekistan for tourist purposes. For comparison, it is worth noting that for the whole year of 2022 the number of visitors had been recorded at 5.3 million. While the growth in demand mentioned above is all good news, to keep up with the rapid tourism growth, it seems the supply side of tourism operations in Samarkand for instance, are choosing questionable methodologies. The local tour operators are relying heavily on traditional tourism narratives in their proposals along with traditional marketing strategies. While marketing strategies play on their own short-term goals, it is important to develop a proper and authentic destination brand for Samarkand, and heritage objects, so that we do not become another 'location' but a true 'destination' in the world travel arena. Proper destination branding should go beyond the traditional tourism strategies and ensure long term if you will, competitive advantage. While traditional tourism is focused on exploring new places and experiencing different cultures, it is interesting to observe to what is being referred to as the new trend emerging in recent years, such as identity tourism. Although, it is argued that identity tourism is not a new trend but rather one of the most ancient motivations in human history that pushed the first travelers around the world. Understanding the local population's identity is also one of the important aspects of developing a destination brand. However, does Uzbekistan and its city of Samarkand, currently possess the so-called recognized self-identity and destination brand? To solve this gap, effective methodologies, scientific approach should be chosen.

Literature Review. To start the discourse, it is essential to understand the difference between destination branding and destination marketing.

While destination marketing focuses on promoting the location itself and the experiences that visitors can have there, branding is concerned with creating a distinctive and recognizable identity that reflects the destination's unique points.

Tourists perceive a destination brand not only with its physical features but also with the perspective of social facts and emotional values it reflects (Kumar & Kaushik, 2017).

Here we must understand that "recognizable identity" mentioned above can only be achieved if the identity has been formed and established. I argue that for the case of Uzbekistan and specifically Samarkand, recognizable identity is still to be re-discovered from its historical past.

In fact, tourism requires image making and branding grounded in the destination's reality. The focus of this required research is grounded in the problem identified and examining the main heritage objects of Samarkand with the aim of discovering their brand identity.

Uzbekistan currently has three outstanding cities focused on tourism, which are Samarkand, Bukhara and Khiva. Among the three, Samarkand is one of the main tourism destinations in Uzbekistan. Now that Samarkand to become World Tourism Capital in 2023 (UNWTO, October, 2023), even more attention is likely to be driven toward the city's tourism potential. Quoting Minister of Tourism and Sports Aziz Abdukhakimov:

"The holding of the 25th UNWTO General Assembly in ancient Samarkand will attract more than a thousand foreign guests and benefit local residents and artisans. In addition, the high-level event in Uzbekistan will undoubtedly attract the attention of the world media. As a result, it will serve to promote the tourism potential of our country and attract more tourists to our country,"(October, 2023)

Yet throughout our analysis heritage objects in Samarkand have not gone through quality place branding strategies. Jumaniyazov S. et al (2020) state that most of Samarkand's historical resources are linked to the Great Silk Road. However, Samarkand is believed to have a wider range of resources and tourism products to offer. In fact, Samarkand's history dates to precede Great Silk Road's existence.

Nigel M. (2015) concludes, that "destination branding is defined as a strategic development plan, aimed at improving life quality in the destination that in turn will attract not only tourism but also investment and skilled migration."

Kotler Ph. (2002) concludes that even when a country does not consciously manage its name as a brand, people still have images of countries that can be activated by simply voicing the name. We assume the same extrapolation can be done for the case of city branding.

No research identifying existing perception of Samarkand's brand as a destination brand has been done so far at a scientific level. This gap should be fulfilled by the studies in the near future.

MethodologyIt is complex to distill a singular practical framework for destination branding as the concept of it still quite complex with each destination possessing unique factors impacting its individuality. A number of methodologies and research strategies have been derived from best practice case studies in the literature. The framework which has been found to be of a fit for the given project addressing its current objectives is by Tasci A. and Gartner W, (2020) which the authors refer to as a practical framework for destination branding. The authors refer to it as a comprehensive research framework with both qualitative and quantitative methods, meaning and assets for the so called demand and supply side of the market. The supply-side perspective can be studied by conducting interviews with local stakeholders, if possible, authorities and decision makers as well as among residents. Also the authors include the content analysis of promotional materials. The demand-side perspective can be researched through focus groups, as well as quantitative surveys, interviews of residents and potential tourists, as well as content analysis of information from independent sources regarding the destination (Tasci A & Gartner W, 2009), the framework is illustrated below in the

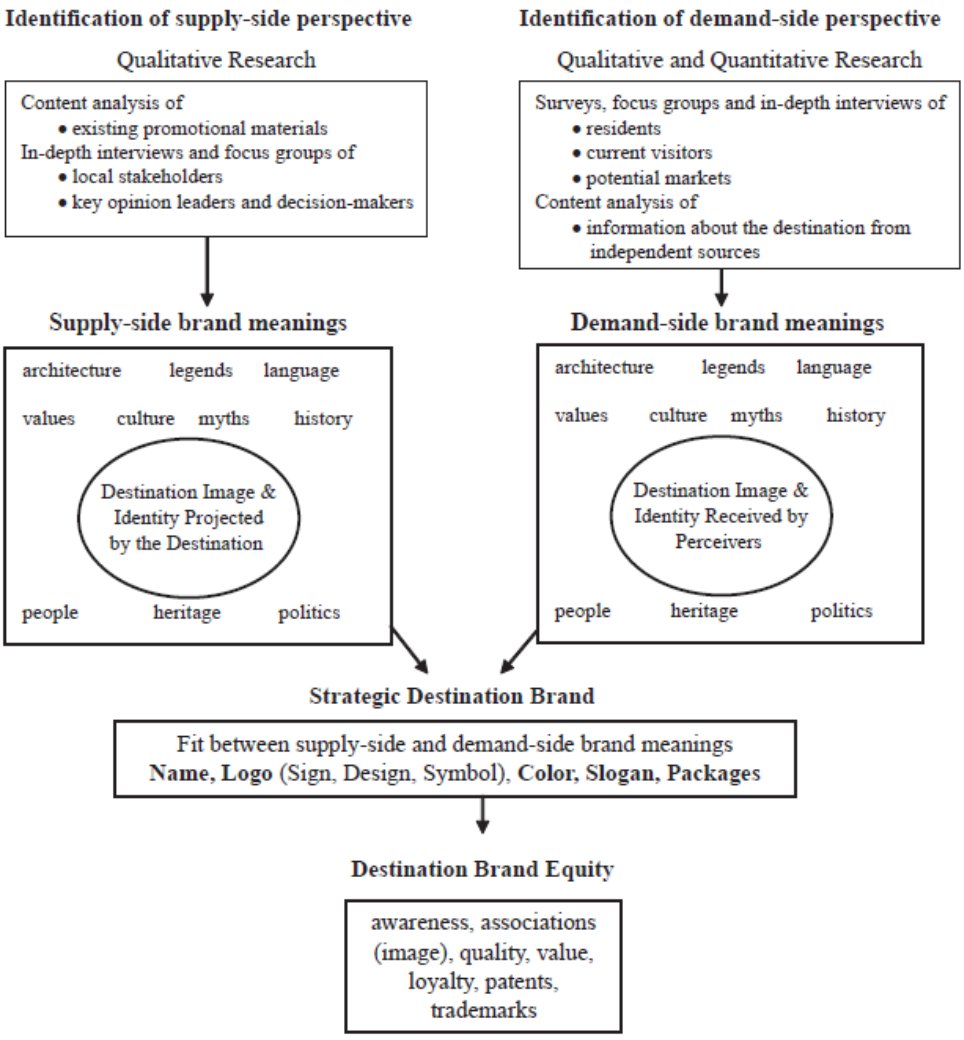

Figure 1:

Figure 1. Comprehensive Framework for Creating Strategic Destination Brand (Tasci A. & Gartner W, 2009)

Discussion and Expected Results. To summaries the discussion above, it was focused on the importance of applying scientific methodology in order to construct an authentic destination branding of the main heritage objects in Samarkand, Uzbekistan. The discussion focused on outlining the need for developing authentic destination branding strategy for Uzbekistan, and Samarkand in particular in the light of rapid tourism development the country is currently experiencing and aims to continue. Expected results will benefit multiple fields including but not limited to the tourism industry. The authenticity of destination branding would benefit the perception of the national heritage and self-identity to one of the main stakeholders of the framework – the local population of Uzbekistan.

For the case of Samarkand the proposal emphasized the need for comprehensive study including both supply side and demand side of the equation where all stakeholders including the foreign citizens and the local population's identity perception is considered. The proposal focused on the need of research for Samarkand to re-discover its roots, identity and itself which has already been formed for many centuries ago but has been hidden under the shadow of past turmoil. The application of the framework will be subject to some of the limitations of research due to its inductive nature yet given the circumstances it is the most optimal instrument we have at hand.

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DIGITAL TECHNOLOGIES IN THE ECONOMY AND THEIR DEVELOPMENT

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Annotatsiya: ushbu maqolada raqamli iqtisodiyotni rivojlantirish xususiyatlari va uning savdo tizimiga ta'siri keng qamrovli muhokama qilingan. Raqamli muhitni rivojlantirish uchun yo'nalish tanlashning ta'sirining qiyosiy tahlili o'tkazilgan. Iqtisodiyotni rivojlantirish bo'yicha ilmiy asoslangan taklif va tavsiyalar berilgan.

Kalit so'zlar: tahlil, metod, tadqiqot, iqtisodiyot, texnologiya.

Аннотация: в данной статье рассматриваются особенности развития цифрового пространства и его влияние на систему торговли. Проведен перекрестный и сравнительный анализ влияния выбора направления развития цифровой среды. Даны рекомендации по внедрению разработок в развитие экономики.

Ключевые слова: анализ, метод, исследование, экономика, технологии.

Abstract: this article discusses the features of the development of the digital space and its impact on the trading system. A cross-sectional and comparative analysis of the influence of the choice of direction for the development of the digital environment was carried out. Recommendations are given for the implementation of developments in economic development.

Key words: analysis, method, research, economics, technology.

Introduction. The “digital economy” refers to the use of information technology to create or adapt, sell or consume goods and services. Digital innovations include digital banking, e-commerce, virtual education, smartphone applications and collaboration platforms.

Three things about the digital economy.

More and more people are using smartphones, tablets, smart watches and bracelets, and other mobile Internet devices to connect to the global environment anytime, anywhere. Millions of people around the world can take part in the digital economy to buy or sell goods and services. Infrastructure. Enterprises have software, hardware and other technological resources, as well as qualified specialists.

Electronic business. Computer applications, online tools and digital platforms help carry out business processes.

E-commerce. A familiar concept, e-commerce means selling goods and services online.

Benefits of the digital economy

The digital economy will have greater weight in the future as the Internet of Things, artificial intelligence (AI), virtual reality, blockchain, self-driving cars and other technologies develop. Some benefits it offers:

Information. Consumers have more information—not only from manufacturers and firms, but also from other consumers on forums and reviews—to make decisions about products and services.

Proximity. Direct customer service channels allow customers to quickly resolve questions and problems with the manufacturer or service provider.

Global presence. By making products and services available to consumers anytime and anywhere, companies can reach more markets.

Safety. Digital technologies, such as strong authentication of online payments, make transactions more secure.

Research methodology. Comparative analysis, expert evaluation, analytical comparison, logical reasoning and grouping methods are widely used in this research. Also, the researches of foreign and local scientists on this topic were analyzed. Official statistics were used in the analysis.

Analysis and discussion of results. The digital economy is transforming age-old manufacturing industries. Agriculture has already begun to benefit from technological innovation. Mobile apps connect crops to farmers, providing them with real-time updated information on quality, soil and irrigation to make management decisions.

Digital platforms are changing the relationship between customers, workers and employers as access to a silicon chip permeates almost everything we do, from buying groceries online to finding a partner on a dating site. As computing power increases dramatically and more and more people around the world participate in the digital economy, we must think carefully about how to design policies that allow us to take full advantage of the digital revolution while minimizing job losses.

This digital transformation is the result of what economists who study scientific progress and technological change call general-purpose technology, that is, one that can constantly transform itself, gradually expanding and increasing productivity across all sectors and industries. Such transformations happen rarely. Only three previous technologies earned this title: the steam engine, the electric power generator, and the printing press. These changes bring huge long-term benefits. The steam engine, originally designed to pump water from mines, gave birth to railroads and industry through the application of mechanical power. Benefits accumulated as farmers and traders brought their goods from the interior to the coast, facilitating trade.

In the Address of the President to the Oliy Majlis, the active transition to the digital economy was identified as one of the most important tasks in the next 5 years. Also, it is not for nothing that this year has been declared the year of development of science, enlightenment and digital economy. In developed countries, the implementation of the digital economy has already begun. In the conditions of the globalization of the world economy and the development of technologies, the economic development of Uzbekistan cannot be achieved without the development of the digital economy. Today, the increasing importance of digital technologies and their widespread introduction and the development of the digital economy have become a serious vital issue for every country. According to researchers, 22 percent of jobs in the world will be created with the help of information technologies during the next 3 years through the digitization of the economy. First, the digital economy is considered a modern stage of development, characterized by the priority of creative work and information benefits. Secondly, the digital economy is a unique theory, the object of its study is information society processes. The theory of digital economy is in the initial period of its development, because the transition of civilization to the digital information stage began only a few decades ago. The term "digital economy" was introduced into scientific practice by Manuel Castells, a Spanish and American sociologist and a leading researcher of the information society. In this regard, he published his three-volume monograph "Information Age: Economy, Society and Culture".

Implementation of the "DIGITAL UZBEKISTAN-2030" concept, which covers all sectors and industries and, first of all, the formation of thorough and perfect organizational and legal mechanisms, as well as the introduction of innovative ideas, technologies and developments ensuring the harmonious cooperation of state bodies and business entities, covering production and service provision in all sectors and industries with digital technologies, cultivating personnel with deep knowledge of modern knowledge and intellectual potential, thereby serving to create an environment of "informed society" in the country. Currently, the digitalization process that is taking place at an

accelerated pace has created a "new economy". This market segment, which is underexplored and growing day by day, provides manufacturers with optimal methods of organizing effective marketing campaigns in business, obtaining maximum profit at minimum cost, and successfully selling goods and services. Quality service and convenience is provided to consumers, buyers and clients. These opportunities are wider than ordering lunch on the Internet, calling a taxi through a mobile application, sending money to a distant relative, and also include cross-border business cooperation, e-commerce space, remote office, etc.

The process of digitalization of agriculture, which is one of the most important areas for our country, is of great importance for the development of our country. Therefore, it is planned to implement 24 projects that serve to bring the networks to a new level. It should be said that there are many problems with the introduction of digital technologies in the agriculture and water management sectors, and there are many issues that need to be solved quickly. Information technologies are very useful in land accounting and monitoring in agriculture. For example, it is possible to study arable land, vegetation process, land reclamation status, and the amount of mineralization through space sensing of the earth. It allows to increase the productivity by 25-30% by specifying agrotechnical measures.

Olimjon Umarov, the First Deputy Minister of Information Technologies and Communications Development of the Republic of Uzbekistan, said that the digital economy is not a separate type of activity, but the active use of information technologies in business, industrial facilities, and services. If material goods are considered the main resource in the ordinary economy, in the digital economy it is information and data that can be processed and transmitted.

All systems are being digitized in Uzbekistan. Especially in the quarantine regime introduced due to the coronavirus, the demand for online goods and services has increased, and the range of digital functions has expanded in all areas. Today, it is possible to make payments without leaving home, get distance education without any problems, use the world's largest libraries and even work. Compared to the traditional type, digital services have a number of advantages, such as the absence of paperwork, formalities, and time savings. For example, if you receive government services digitally, you will receive a discount of 10 percent of the fixed fee.

All this is a sign of the active transition to the digital economy in our country. Another factor in the development of the digital economy is the provision of cyber security. In quarantine conditions, there have been cases of distribution of viruses that crash software systems on the global network under the label of instructions for avoiding the coronavirus. Financial fraudsters have used fake online stores, websites, social media accounts and email addresses to trick unsuspecting people by promising online sales and delivery of drugs abroad and asking for advance bank transfers. This once again confirms the need to ensure information security. As for the choice of products, most of the respondents preferred to buy clothes, as well as household appliances and electronics via the Internet. Automobiles and real estate items were the least purchased goods over the Internet. This can be explained by the fact that at the moment the user is not yet ready to give large amounts of money in the "online" mode. In addition, users actively use payment systems such as UzCard, VISA, MasterCard. The least popular systems are Union Pay, WebMoney and cryptocurrencies. When it comes to problems with purchasing products online, almost all respondents mentioned payment difficulties, poor product/service quality, long delivery times, and expensive prices. Thus, based on the information obtained as a result of the public survey, we can mention a number of problems and shortcomings that are stopping the development of electronic commerce in Uzbekistan:

1. The fact that the population does not trust electronic transactions;
2. The high cost of delivery;

3. Low quality of goods/services;
4. Fear of fraud;
5. Low level of computer literacy.

Conclusions and suggestions. Based on the above, it can be concluded that the launch of such large-scale projects will rapidly increase the place and role of digital technologies in our lives and their coverage throughout the country in the year of development of science, enlightenment and digital economy. The system is constantly developing, large-scale and complex projects are being put into practice. At the same time, we still have important tasks that need to be completed. One of the priority tasks is the introduction and use of digital technologies in all sectors and industries, which is considered one of the main strategies of Uzbekistan. For example, we can take measures to prevent cyber security, information security, and viruses that destroy software systems.

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VIEWS OF SCIENTISTS OF THE COMMONWEALTH OF INDEPENDENT STATES (CIS) ON ECONOMIC COMPETENCE

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Annotatsiya: Ushbu maqolada Mustaqil davlatlar hamdo‘stligi olimlarining shaxsning iqtisodiy madaniyati ta’lim-tarbiya jarayoni, iqtisodiyot harakat asoslari to‘g‘risidagi chuqur, mustahkam bilim va insonning bu bilimlardan ijtimoiy-hayotda qo‘llay ola bilish qobiliyatlari hamda pedagogika oliy ta’lim muassasasi talabalarining iqtisodiy kompetentlikka doir masalalariga urg‘u berilgan.

Kalit so‘zlar: iqtisodiy madaniyat, iqtisodiy jarayonlar, ishlab chiqarish, inson kapitali, pedagogik muammo, genetik tahlil, tadbirkorlik, iqtisodiy kompetentlik.

Аннотация: В данной статье делается акцент на глубоких, прочных знаниях ученых Содружества Независимых Государств об основах экономической культуры личности учебно-воспитательного процесса, экономическом движении и умении человека применять эти знания в социально-жизненной сфере, а также на вопросах экономической компетентности студентов педагогических вузов.

Ключевые слова: экономическая культура, экономические процессы, производство, человеческий капитал, педагогическая проблема, генетический анализ, предпринимательство, экономическая компетентность.

Annotation: This article emphasizes the economic culture of the individual of scientists of the Commonwealth of independent states with deep, solid knowledge about the educational process, the fundamentals of economic action and the ability of a person to apply this knowledge in socio-life, as well as the issues of economic competence of students of a pedagogical higher educational institution.

Key words: economic culture, economic processes, production, human capital, pedagogical problem, genetic analysis, entrepreneurship, economic competence.

Introduction. Early concepts of economics go back to the distant past. These concepts continued to develop in accordance with the progress of mankind. Knowledge related to economics has been cited in the works of Aristotle, Plato, Xenophon, prominent scholars of the ancient world, as well as scholars of Ancient Egypt, China, India, and Central Asia.

Social updates that have occurred in Uzbekistan cause complex psychological processes in the individual's consciousness. It affects the motivation of work, assessment of the personal situation, therefore, in various manifestations aimed at proving these situations, knowledge and abilities, additional pedagogical tools are needed, with which students will try to independently acquire skills and will be able to choose an optimal solution from a series of alternative options.

Literature analysis: N.V.Kavkayeva and S.G.The economic culture of the individual was interpreted by the medyanseva as the subject of the educational process. Scientists define personal ethics in the organization of educational and educational activities in order to develop economic culture, economics as a deep, solid knowledge of the basics of action and the ability of a person to apply this knowledge in socio-life. Many experts reflect on the training of competitive personnel (A.M.Kadirov, L.M.Mitina, U.X.Nigmatjanov. This is evidenced by the integrality of economic competence in the structure of competitiveness and its importance for competitiveness.

T.Bloxin, O.N.Bikova, T.K.The scientific research of Ermolaeva focuses on the management of an innovative organization, the role and role of the organization in economic processes, the analysis of the diversity of structures and forms of Organization of enterprises, the formation and management of resources. An important place is given to the system of effective management influence in the conditions of market relations by determining economic resources, assessing the intellectual and

productive potential of the organization, financial analysis of its activities and the development of investment policies.

M.Viculina competency-based approach describes knowledge, and the skills, actions of a person, as a result, what directly connects the applied knowledge with specific (measurable) achievements indicate activity-specialist news, ability (or take personal responsibility for the results obtained and understand the limits of this responsibility itself.

E.Savina vision of the future is a dream image of the future, which expresses the aspirations and intentions of a company or person built according to the changing model of the world, and the future is in the knowledge economy–a type of economic development in which the development of Science and education prevails, human capital has thought about the high-tech industries and services.

N.The formation of professional competencies by Zaichenko, as a condition of professional training, pedagogy paid special attention to the issues of the formation of the economic culture of students of a higher educational institution.

Of the many pedagogical researchers, V.Abrosimov and I.Shakinas believe that economic culture is, first of all, a set of knowledge, understanding information that is carried out in educational and educational activities. In turn, economic education refers to the result of the process of mastering systematized economic knowledge, abilities and skills in students, being able to formulate principles and apply them in practical activities, making it possible to develop economic thinking as a condition of effective economic activity.

A.B.Shemyakin conducted a historical and genetic analysis of the problem based on the study of philosophical, economic, psychological and pedagogical literature on the basis of" the formation of responsible economic behavior of high school students as a pedagogical problem in a business game." The degree of its resolution in the practice of a comprehensive school is indicated. Interpretation of the basic concepts of research is given. In this business game, a structural and functional model of the formation of responsible economic behavior of large schoolchildren has been developed and theoretically based, and monitoring of this process has been proposed

Y.Charushina considers students of classes in the socio-economic profile of entrepreneurship, education as an integral feature of the essence of the enterprise in modern pedagogical theory and practice. The criteria and indicators of the personality and its formation summarize the conditions of the socio-economic profile of education, in which the essence of the entrepreneurial formation process is hidden.Conducted experiments on the upbringing of business qualities. Having developed a model for the formation of entrepreneurship, the formation and training of entrepreneurship in high school students, an analysis of experimental results is given.

Research Methodology: The task of forming economic competence in the student-youth of our state is, of course, assigned to educational institutions. Therefore, the higher education system should coordinate important spiritual and educational measures that take the development of the state to a higher level, explain to students social values in the economic sphere, help to understand the meaning and essence of the laws and decisions in force, their importance in society and human life. An important issue in the development of economic culture, which is a component of economic competence in student-youth, is the implementation of an effective pedagogical process in a new socio-economic context, strengthening the role of higher educational institutions in this process.

At present, the need for Economic Education as early as the preschool age is N.I.Gorodetskaya, M. Sh.Kadirov, A.P.Kazakov, N.V.Michałković, A.A.Kharunjev, Y.Charushina, B.P.It is clearly reflected in the work of Shemyakin and other such scientists. Russian scientist M.M.Shalashova believes that the competence of a specialist is his integrated personal property and is understood as the ability to solve problems arising in life and work activities on the basis of his knowledge, experience and personal talent. Usually in qualification practice, the competence of a specialist is determined based on the following indicators:

* professional competence;
• good knowledge of his field;
* regular improvement of professional qualifications;
• work on your own;

• responsibility for his decisions.

S.Vlazneva argues that economic preparedness disciplines provide ample opportunities for the application of interdisciplinary teaching methods. A number of tasks facing the Economic Sciences: the development of analytical and critical skills thought about the connection between thinking, theory and practice, examples of the consequences of Representative adopted decisions, the ability to present, formulate, evaluate alternative solutions, apply basic knowledge in different ways.

E.In Dukanova's views, the solution to the problem of social guarantees of the younger generation in the context of a new system of economic relations is a priority for society today. Youth indifference, both Labor and Social, is growing. Market relations require the formation of personal qualities such as initiative, entrepreneurship, prudence, labor and professional mobility. The existing socio-economic conditions require a high level of Economic Education and the upbringing of the younger generation.

Analyzes And Results. S.General educational principles based on the theoretical preparation of the teacher for Economic training in Cherner studies:

- subordination of economic learning to the task of developing the creative activity of the individual and the upbringing of his conscious attitude to work;
- universality and systematics of Economic Education and education at each stage formation of the younger generation;
- mandatory economic and methodological training during the transition to improve the professional training and qualifications of each employee.

I.Andreyeva, adopting the principle of activity of social psychology as one of the principles of her special methodology, adapts it to the main topic of research — the group. Therefore, the most important content of the principle of activity in social psychology is revealed in the following rules:

- understanding activity as a joint social activity of people, during which absolutely special contacts appear, for example, communicative ones;
- understanding not only the individual as a subject of activity, but also the group, society, that is, the introduction of the idea of a collective subject of activity, makes it possible to study these real social groups as certain systems of activity.

Today, modern problems of training highly qualified specialists are closely related to the general problems of education and the development of the culture of society. In accordance with the existing legislation, the culture of the educational system and the harmony of the educational sphere in our country are carried out together. In fact, education is the basis of entry into culture, it is this education that forms the personality, nurtures the personality, develops its culture. Based on the results of the study, the following structural structure of the economic competence of future educators was clarified (See Figure 1).

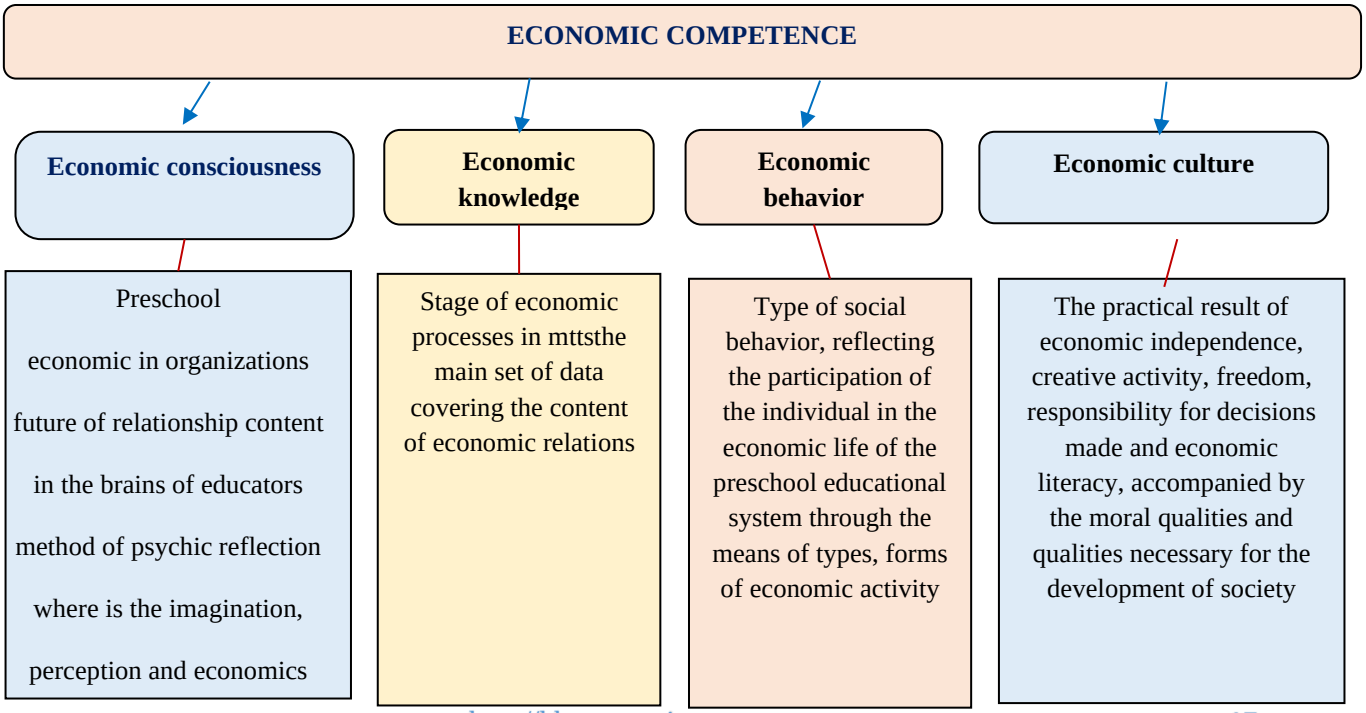

Figure 1. Structural structure of economic competence of future educators

In instilling in students the concept of economic competence, it is necessary, first of all, to form the relationship of the subject and the object in their implementation of universal values, economic competencies, their personal capabilities in economic processes, that is, in it, not only as the object – consumer, but also as the subject – manager, entrepreneur must be the producer and participant.

In the future, the effectiveness of the process of forming the economic competence of a qualified specialist is carried out in higher educational institutions under the following conditions (See Figure 2).

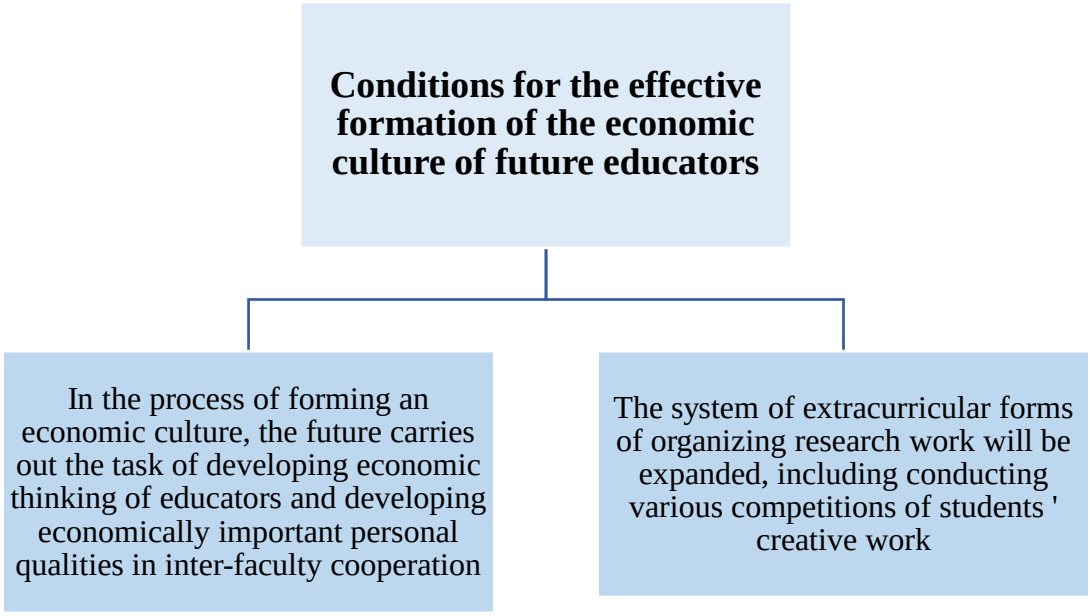

Figure 2. Economic competence of future educators effective formation conditions

Thus, the most effective tool for the formation of the economic culture of a qualified specialist in the future is an individual – oriented research approach. This approach, enriching the process of professional training with economic knowledge, skills and qualifications, allows him to simultaneously train economic thinking, the development of personal qualities of economic importance, socially oriented motives, relationships and moral values.

Several parameters affect the quality of economic competence, as well as the general formation of culture in the field of economics, but this can be turned into a decisive role of humanitarian components. Thanks to this, an integral fantastic vision of the future specialist develops and a scientific worldview is formed, which is the most important task of Education. Scientific disciplines such as philosophy, pedagogy, world history, ethics, aesthetics, sociology, psychology and cultural studies teach future specialists culture, the development of science, various moral teachings.

Conclusions.

1. Ancient sources on economics and economic competence, the study of the teachings of pedagogical psychologists of the CIS is an important factor in the formation of economic culture. E.Savina vision of the future is a dream image of the future, which expresses the aspirations and intentions of a company or person built according to the changing model of the world, and the future is in the knowledge economy–a type of economic development in which the development of Science and education prevails, human capital has thought about high-tech industries and services, which" Here we see a reflection on the healthy generation that there is a correlation between economic and cultural, spiritual upliftment.

2. In order to develop economic competence in students, it is important to study the relationship between the economic education of teachers and the study of economics by students in the studies of cis scientists. This in turn is an important factor for the implementation of international cooperation, the development of a new set of data on economic competence by default from foreign experiments and the research on their use and the creation of innovations.

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THE MAIN CHARACTERISTICS OF BERUNI’S SCIENTIFIC HERITAGE

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Annotatsiya: Ushbu maqolada Beruniyning pedagogik qarashlari asosida uni barcha fanlarga oid ya’ni tabiiy-ilmiy g‘oyalari, tabiatshunoslikda erishgan aniq natijalari, hamda allomaning ilmiy merosi va tabiiy-ilmiy qarashlari aks etgan asarlari o‘zaro chambarchas bog‘liqligi ochib berilgan.

Kalit so‘zlar: Uslubiy yo‘nalish, novatorlik mohiyati, ilm-fan, qulzum [dengizi], quruqlik, dunyo, okean, bilim, ilm, izlanish, geologiya, tabiat, fanlar rivoji.

Аннотация: В данной статье на основе педагогических взглядов Беруни выявляется, что его естественнонаучные идеи, конкретные результаты, достигнутые в естествознании, а также его научное наследие и его работы, отражающие естественнонаучные взгляды, тесно связаны друг с другом.

Ключевые слова: Методология, сущность инноваций, наука, море, земля, мир, океан, знания, наука, исследования, геология, природа, развитие наук.

Annotation: In this article, on the basis of Beruni's pedagogic views, it has been revealed the close relationship between Beruni's works, which reflect his scientific heritage and natural scientific views, and the concrete results of his natural-scientific ideas in natural sciences.

Key words: Methodical orientation, essence of innovation, science, sea, land, world, ocean, knowledge, science, research, geology, nature, development of sciences.

Introduction. Beruni's natural-scientific views are reflected in his works, which reflect the concrete results he achieved in natural science, and are one of the main components of his

multifaceted scientific heritage. Scientist's works reflecting his scientific heritage and natural-scientific views are closely related to each other, and they define each other's general and specific aspects, methodological direction and foundations. As noted by world scientists, the scholar's scientific achievements are distinguished by their innovative nature, the fact that they are far ahead of the views of their time, and the advanced research method. Even after the publication of many works devoted to the research of Beruni's scientific heritage, the French scientist A. Meli wrote, "Beruni's genius has not yet found its full description" [1] was . We think that the analysis of the natural-scientific heritage of Alloma as a whole and as a whole, which has been covered by foreign scientists, will help to reveal its new general and special features, which are unknown to the scientific community. It should be said that Beruni's principles used in the study of the history of Indian pedagogy can be cited as the most vivid example of an objective approach to the history of science, in particular, pedagogy. One of the most important demands of a scientist is to describe the essence and content of these teachings and analyze them in their original state. Beruni writes about the work "India" dedicated to the study and illumination of Indian pedagogy, other science, social life and religious beliefs: I wrote it without pain [as the teacher said]. This book is not a book of arguments and arguments, so in this book I do not give proof of the enemies and I do not oppose those who deviate from the truth. Bu faqatgina bayon qilish kitobidir, xolos”[2].

Literature Analysis. Foreign scholars in our country and abroad have emphasized the scholar's scientific research methodology, including his very successful use of the comparative method in studying the pedagogical thinking of other nations. We can observe this in the works of the aforementioned E. Zahau, F. Rosen, U. Pope and many other researchers. They show that the comparative method of the scholar has a deep scientific content and essence, and first of all, it is aimed at an objective and correct research and assessment of the object under investigation. For example, G. Nasirkho'jaeva, while analyzing the historical-pedagogical methodology of Alloma, comes to the following conclusion about his comparative scientific method: "On the one hand, the existence of spiritual processes and principles that determine the general features and characteristics of the development of scientific and pedagogical thinking, on the other hand, the fact that the course of these events is connected with each nation's uniqueness, special qualities and features, needs another important and deeply meaningful methodological requirement and principle. He also considers it necessary to compare the results of the development of science in each nation in order to know their situation on a global scale" [3]. The important importance of Beruni's theoretical interpretation of the comparative method, description of its purpose and essence is that it helps to serve more productively in the research of the scholar's scientific heritage. In the work "India" he writes about it as follows: "I write the word Indians here by myself, I add to it some similar words of the Greeks to show that they are close to the Greeks. Because, even if the Greek scientists try to explain the truth, they cannot deviate from their beliefs and sharia in the concepts of the common people. I will not explain the words of others together with the words of the Greeks, I will only add the words of the Sufis or any of the Christians. Because all of them have similar concepts about hulul and ittihad [4]". revealed the main features and supposedly clarified what research methods should be used in relation to the study of his scientific heritage.

Research Methodology. It should be considered that Beruni's scientific and especially pedagogical heritage has not only general, but also deeply unique and unique aspects, in its research it is necessary to use special methods suitable for those aspects in addition to general research methods. The methodological principle necessary for the analysis of these features of Alloma's studies is, in our view, most perfectly described by him himself: "For such [cases], Galen wrote a book, saying that a virtuous physician [person] is also a philosopher." should love wisdom and seek it. Philosophy, that is, wisdom, for the Greeks, consists in knowing the truth of everything that exists in the collective existence. If a person is inquisitive, he can talk about the full meaning of a branch of science. For this, he must be a philosopher, he must have mastered the basics of all knowledge, because his whole life will not be enough to fully study all branches of science" [6]. As mentioned above, the main features of Beruni's scientific heritage determine the uniqueness and unique principles of his research methodology. From the very beginning of the development of this field,

Western foreign scholars have emphasized that one of the most important features of scholarly research is the innovative nature and importance of its foundations. He always tried to achieve new important results, no matter what scientific field or problem he was dealing with. Often they serve as a powerful impetus for the further development of the relevant science in their time or after several centuries. Alloma's scientific achievements, aimed at innovation and discovery of new results, were summarized in his work "Masudi's Law". "With these two types (affirmation and proof) true science is formed, because proof and certainty are characteristic of true science, as the human personality is seen in a perfect image with the body and soul" [7]. According to I. Yu. Krachkovsky, some of Beruni's scientific ideas and discoveries were far ahead of his time, so they were difficult to understand in the Middle Ages [8]. For example, ideas about the general characteristics of functional connections in the field of mathematics developed in the European science of the 14th century [9]. In the scientific work of the scientist, in almost all of his works, it can be seen that first of all, natural-scientific and pedagogical approaches are closely connected with each other and complement each other. This feature of Beruni's heritage, on the one hand, indicates the qualities inherent in his scientific thinking, and on the other hand, it is important for imagining the general picture of the world of alloma natural scientific research, many of which are large-scale, and most importantly, related to the structure of the world. shows that there are major problems. This conclusion of Beruni's works can be cited as one of the most vivid examples of natural-scientific and pedagogic issues being closely related and defining each other to one degree or another. This scientific innovation discovered by Western scientists was later widely used by a number of Eastern and Russian scientists and interpreted in their own way.

It is known that the problems related to the fields of geology and geography, such as the formation and change of seas and continents, are gaining not only theoretical, but also important practical importance in modern times. Several Western and Eastern scholars have emphasized that Beruni's deep theoretical and practical approaches are extremely important in solving these issues.

Analyzes And Results. Then he comes to the idea that they [the seas] will meet, according to the stories of those who sailed the seas and were shipwrecked by the wind. Even in our time, there were such things that not only strengthened that opinion, but also proved it. The fact is that woven boards of ships were found in the Orovchi Sea, opposite its junction with the Levant Sea. Such [planks] [could be woven] in the Indian Sea, where there is an abundance of magnetism, but not in the Western Sea, for in it the [planks] in ships are joined together with iron nails and not woven. The discovery of such [boards] in that [sea] is proof of the connection of the two [seas]. Then he comes to the idea that they [the seas] will meet, according to the stories of those who sailed the seas and were shipwrecked by the wind. Even in our time, there were such things that not only strengthened that opinion, but also proved it. The fact is that woven boards of ships were found in the Orovchi Sea, opposite its junction with the Levant Sea. Such [planks] [could be woven] in the Indian Sea, where there is an abundance of magnetism, but not in the Western Sea, for in it the [planks] in ships are joined together with iron nails and not woven. The discovery of such [boards] in that [sea] is proof of the connection of the two [seas]. But this [connection] is not on the side of the [Sea of] Qulzum, because there is a narrow stretch of land between it and [the Sea of Sham]. Then, it is unlikely that they were connected by the sea to the north, since in this case these boards, broken in the Indian sea, would have to pass through the connecting strait on the eastern side of it. Then it had to go around the place below the polar zenith in the north or pass through the northern quarter, which is opposite the administrative part [of the Earth] and also belongs to the lower [part of the] [Earth]" [11] 135.

It is known from this passage that Beruni introduces important innovations to the concept of the ancient Greek geographer Claudius Ptolemy regarding the location of oceans and continents on the globe.

According to Beruni, the strait connecting the two oceans in the East, the "Orovchidengizi", that is, the world ocean, forms a single body of water. It is known that this information was proven in Europe several centuries later.

The fact that he predicted the existence of the American continent is a great result of Beruni's research method, which is emphasized by Western scientists in several foreign scientific works. Beruni

mentions the issue of the existence of another continent behind this ocean in his work "India" and tries to prove it in a deep and comprehensive way on a scientific basis: "Imagine the part of the Earth where people live: this part is in the northern half of the Earth, and this half is is half. Humans live on a quarter of the land.

This part is surrounded by a body of water called Muhit from the West and East. The Greeks call the western part of this sea, which is their province, Ukyonus (ocean). This sea separates the western and eastern sides between this part of the Earth and the land or inhabited continent that may be on its other side" [12].

Beruni put forward his conclusions about the movement of the continents and predicted one of the newest discoveries of our time. According to Alloma, the continents move very slowly, without being strictly fixed in one place. According to the conclusions of modern geology and other related sciences, the continents were once, from a geological point of view, a whole continent in the distant past, then separated, and are still undergoing certain shifts in their position. Beruniy, who attracted the serious attention of Western scientists in the field of geology, expressed ideas about the geological layers of the earth, the process of mountain formation, the movement of land and seas, the ancient hydrogeological condition of Khorezm, and found solutions to other important problems. It can be found in the scientific works of Western scientists.

Conclusions.

1. By reading this article, you can learn about Abu Rayhan Beruni's natural and scientific ideas on all subjects based on his pedagogical views.

2. It is scientifically proven that the specific results achieved by Abu Rayhan Beruni in natural science, as well as the scholar's scientific heritage and natural-scientific views are closely related to each other.

3. In this article, Abu Rayhan Beruni put forward his conclusions about the movement of the continents and stated that it is one of the newest discoveries of the present time. and from the conclusions of other related sciences, it is possible to know that the continents were once, geologically speaking, a whole continent in the distant past, then separated, and even now their position reflects the course of certain shifts.

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THE FORMATION AND DEVELOPMENT OF POSITIVE ATTITUDES TOWARDS THE LESSON IN PRIMARY SCHOOL STUDENTS AS AN URGENT PEDAGOGICAL PROBLEM

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Annotatsiya: Ushbu maqolada boshlang‘ich sinf o‘quvchilarida darsga ijobiy munosabatini shakllantirish, o‘quvchilarning qiziqishi, uning shakllanish bosqichlari hamda o‘quv-biluv motivatsiyasini oshirish borasidagi ilmiy izlanishlarni tahlil qilish tadqiqotning dolzarb pedagogik muammo ekanligiga doir ma’lumotlarga urg‘u berilgan.

Kalit so‘zlar: Boshlang‘ich sinf o‘quvchilari, ijobiy munosabat, dars, motivatsiya, pedagogik muammo, tadqiqotchi, kognitiv ehtiyoj, mustaqil fikrlash.

Аннотация: В данной статье делается акцент на данных о том, что актуальной педагогической проблемой исследования является анализ научных исследований по формированию у учащихся начальных классов положительного отношения к уроку, повышению интереса учащихся, этапам его формирования и учебно-познавательной мотивации.

Ключевые слова: У младших школьников позитивный настрой, урок, мотивация, педагогическая проблема, исследователь, познавательная потребность, самостоятельное мышление.

Annotation: This article emphasizes information on the fact that the analysis of scientific research on the formation of a positive attitude of students to the lesson in primary school students, the interest of students, the stages of its formation and the increase of educational motivation is an urgent pedagogical problem of research.

Key words: Elementary students, positive attitude, lesson, motivation, pedagogical problem, researcher, cognitive need, independent thinking.

Introduction. Today, it is important to determine the pedagogical and psychological conditions and methods of targeted learning of educational opportunities, to carry out pedagogical research on the connection of education with the development process, to improve the theoretical and methodological aspects of primary education, to improve the theoretical aspects of educational processes, as well as to use innovative methods in the development of basic and cognitive competencies of The creation of a model of pedagogical processes aimed at improving individual abilities, which form a positive attitude towards the lesson in elementary students, indicates that it serves to develop a positive attitude of elementary students to the lesson. After all, this research work is important in the formation and development of a positive attitude of Primary School students to the lesson and in the development of criteria for assessing this process.

The main condition for the formation of a positive attitude towards the lesson in primary school students is the formation of interest in reading in them. Therefore, first of all, the analysis of scientific research on the interest of students, the stages of its formation and the increase of educational and cognitive motivation expresses itself that research is an urgent pedagogical problem.

Literature Analysis: In the work of pedagogical and psychological research scientists, one aspect or another of the issue of stimulating interest in reading in schoolchildren is covered, which proves that the formation and development of a positive attitude of Primary School students to the lesson is an urgent pedagogical problem.

Within the framework of our study, many definitions of the concept of interest are given. In many studies, the concept of" interest " has been interpreted in different ways. Including L.K.Maximov said that " interest is a form of manifestation of cognitive need, which ensures the

orientation of the individual towards the implementation of the goals of activity, thereby helping to get acquainted with new facts, to reflect reality more deeply" [2. 16-b] deya describes.

Interest is considered one of the important psychological aspects of the individual, in which the individual character of a person is directly embodied. Interest directly plays an important role in the worldview, beliefs, ideals of people, that is, its higher goals, noble intentions, aspirations, and serves to ensure their successful survival.

The concept of" cognitive interest " is one of the most important areas of the concept of interest and is important in primary school age. At this age, reading is the main activity, with a cognitive nature aimed at acquiring knowledge, and based on this, it can be argued that the concept of cognitive interest is a more specific concept than the concept of interest in learning.

Thus, cognitive interest can be called the activity of an individual aimed at the activation of objects, phenomena, phenomena of the surrounding world, mental processes, human activity, his cognitive abilities.

A distinctive feature of cognitive interest is not only cognitive, but also the ability to enrich and activate the process of any human activity, since each of them has a cognitive principle. A particular type of interest can be distinguished from sufficient classification of" cognitive interest". This form of interest is interest in learning (reading).

There are many point-of-view interpretations of this concept. A.R.In his research, Mishina emphasized the interpretation of the essence of the student's concept of interest in reading. In his opinion, " interest in reading is formed and developed in the process of activity, like any personal characteristic of a student" [7. 166-b]. From this point of view, it can be concluded that the formation of a positive attitude towards reading, motivation, the process of consciously organized activity occupy an important place

Distinguished psychologist, professor S.I.Samigin interpreted interest from a psychological point of view and divided it into two groups: indirectly, arising from the externally absorbing attractiveness of a particular object; - bilvosta, the interest that arises on the way to achieving the objective of the activity.

At the same time analyzing the presence of a number of effective factors for increasing interest in reading in elementary students, he classified them as follows:

- content of educational material;
- the teacher's ability to communicate information correctly;
- personal qualities and individual characteristics of the student.

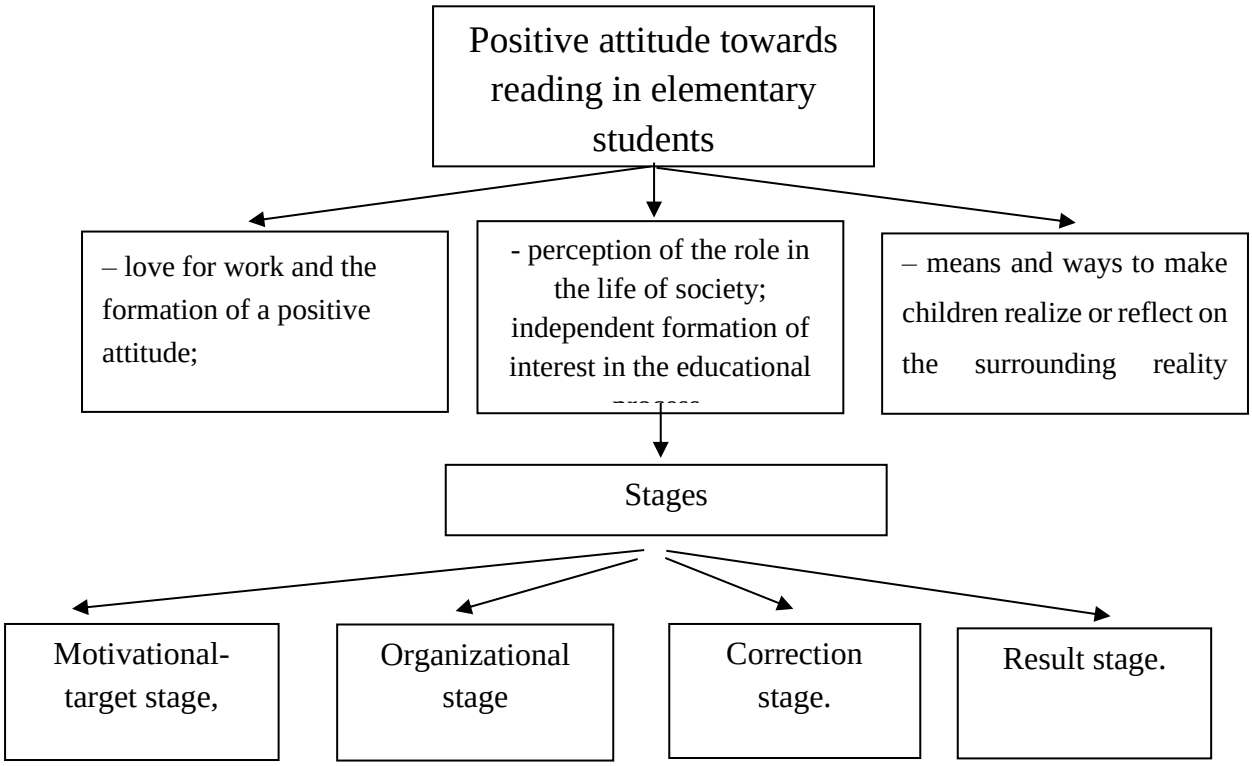
N.Vinogradova believes that " the interest in reading, like the personal characteristics of the student, can be formed and developed during the course of reading activities. To do this, it is necessary that each educator systematically organizes the educational process, the principles in question are: to take into account the age and psychological characteristics of students; to use new teaching methods; to establish the correct distribution of time" [4. 7-b] like. It is based on these principles that form cognitive interest in the reader.

Research Methodology. The elementary student experiences a great sense of joy when he learns to read and write, when he himself learns to solve an example or issue. It is one of the main tasks of the elementary school teacher to bring to the surface as much as possible the feeling of joy in his work in students and turn it into an emotional aspect of the student's character. The intellectual perception of elementary school students is related to his cognitive interests. The elementary school student is very interested in what happened, where, when and how, as well as asking him "Why did it happen?"the answer to the question is interested in the facts themselves associated with this event.

So, in the formation of a positive attitude of Primary School students to the lesson, it is also possible to develop in them by initially developing an interest in reading, mastering and forming a motive in relation to learning. In this case, the teacher should correctly select educational methods, tools, forms and technologies, taking into account the age and individual characteristics of students in the organization of the lesson, as well as master ways to achieve an effective result.

Motivational-purposeful stage, during which the child develops a positive attitude to the intended activity, there is a motive for success, a desire to work successfully.

Organizational stage. At this stage, it is necessary to organize a lesson session by the teacher, taking into account the individual abilities of students, so that mental work gives each student pleasure to perform their educational and practical tasks.



1.- fig. Methodological conditions and stages of the formation of a positive attitude to study in primary school students

Correction stage. Here, the initial results are summarized and the initial training strategy is modified taking them into account.Effective stage. Comparing the expected assessment with the real one involves summarizing the results of the work. The above aspects expand the motivational and semantic foundations of education, attract children to active creative work, form successes in educational activities, which, in turn, increase the quality of Education.

It is important to take into account the content and practical significance of the main pedagogical concepts, which are the basis of personal development, when the teacher organizes the educational process at the educational institution on a scientific basis and changes the Y and learns the opinion of students, as well as forms their interest in education in the processes of working with children in

The development of the personality of children in a positive attitude to the lesson is primarily determined by the formation of personal qualities in them. Therefore, the process of development, which manifests the improvement of the physical, mental, moral and other qualities of the personality of children in the lesson discipline negative mynosabat, is the process of development.

"Development is the qualitative changes in the psyche and organism of a person. These changes occur as a result of the influence of the social environment, housing conditions, people surrounded by it. A person is not given any, neither social nor non-social, programs of behavior in an innate way. The process of formation of qualities as a person for a Hap person practically begins from scratch. Therefore, educational conditions aimed at certain goals do not negate the General Laws of the formation of a person's personality" [5. 377-b].

Therefore, an important role in the development of physical, mental, moral and other qualities of the personality of children in a negative attitude to the lesson discipline, that is, in their education and upbringing, is played by educational institutions established by society, as well as the activities of teachers, which are considered the main subjects of the educational process, that is, the educational

"Nurture is a process that plays a fundamental role in human development, a necessary activity that ensures that one generation's social experience is assimilated by the next generations and that

they are integrated into social life. Upbringing is a pedagogical concept that has historically been formed in connection with the formation of personal qualities as the norm of human upbringing. With it, science and practice prove the influence of the external environment on the development of a person. Throughout his life, a person relies on the experience of someone in life and mainly forms his skills and abilities for him. He only joins the social life as heir to the past and prepares for the future" [3. 246-b].

Analyzes And Results. In the processes of formation and development of a positive attitude to the lesson in primary school students, teaching them to think independently and freely, the formation of reflexive skills, the consistency and continuity of the development of a wide worldview and thinking, as well as the assumption of content dependence and relevance, serve to change their worldview, the formation of Also, in this process, as a result of providing students with concepts about independent education, self-education and the content, importance and necessity of independent activities, a positive attitude towards life, study and work is formed in them.

From these points, this aspect is known that the interaction between the teacher and the students plays a special role in shaping the positive attitude of students towards the lesson. Special research has also been carried out by a number of scientists on the need to form a culture of interaction between a teacher and a student. In particular, the author believes that "the concept of reciprocity is relatively broad and does not only imply information exchange, but also represents the self-transformation of the subjects of reciprocity, that is, the fundamental path of reciprocity in consciousness has been researched as dialogue" [2]. The author classified the following as aspects that reflect the level of formation of the culture of dialogue-based relations: mutual exchange of ideas, assimilation of moral patrons, free expression of their thoughts, independent functioning, one-to-one asking, drawing conclusions, like-minded, activation of social experience, discussion of their materials, classification of knowledge, formation of inclinations, etc.

In our opinion, the student is able to independently provide information about a particular topic, look together with other members of the group in the process of solving educational tasks, listen to different point-of-view views of each participant and make adjustments to the points expressed; putting educational assignments before students is precisely in establishing a positive relationship between the teacher and students; introducing a process;

The formation of a positive attitude to the lesson in students is the formation of processes and behaviors aimed at developing the skills of independent activity, that is, independent education, self-education and understanding of the content, importance and necessity of independent activities, and above all, a tendency to study and acquire knowledge is formed in them, which, in turn, determines the need

As the results of practical activities show, a positive attitude to the lesson is actively formed in the process of collaborative mental and physical work, in the process of the student's personality entering into interaction, in the course of individual thinking, independent thinking, reading and knowledge in students or a voluntary student. In the process of collaborative activities, in a student who reacts positively to the lesson, personal qualities such as a critical look at his activities, self-criticism, self-objective assessment, self-examination, control, independent thinking and reasoning are formed.

Conclusions. Therefore, in the processes of formation and development of a positive attitude to the lesson in primary school students, it is necessary that a volitional person is mainly brought up in two ways by the direct influence of someone, that is, by teaching, reading wise thoughts, attitudes and works, as well as taking into account that a person can draw conclusions from his thinking,

In the processes of formation and development of a positive attitude to the lesson in students, it is advisable to pay special attention to the emergence of a tendency to read and learn in them, to teach them to think more freely and independently in the processes of working with students, to move from subject-object relations to subject-subject relations, that is, to

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EVALUATION CRITERIA AND ITS FEATURES IN HIGHER EDUCATION

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Annotasiya: Mazkur maqolada oliy ta’limda baholash mezonlari va uning xususiyatlari yoritilgan. Oliy ta’limning mazmun mohiyatini tubdan takomillashtirish o‘sib kelayotgan yosh avlodni xalqaro standartlarga mos kadrlar bo‘lib yetishishiga ko‘maklashuvchi jarayondir. Oliy ta’limning talabi har tomonlama, raqobatbardosh va malakali qadrlarni tarbiyalash bo‘lib, bunda baholash tizimining o‘rni alohida ahamiyat kasb etadi.

Kalit so‘zlar: baholash mezonlari, innovatsion ta’lim, interaktiv yondashuv, kreativlik, kompetensiya.

Аннотация: В данной статье описаны критерии оценивания и их особенности в высшем образовании. Коренное совершенствование содержания высшего образования-это процесс, способствующий воспитанию подрастающего поколения как кадрах, соответствующих международным стандартам. Требованием высшего образования является воспитание всесторонних, конкурентоспособных и квалифицированных кадров, при этом особое значение приобретает роль оценочной системы.

Ключевые слова: критерии оценки, инновационное обучение, интерактивный подход, креативность, компетентность.

Abstract: This article covers the assessment criteria and its features in higher education. The radical improvement of the essence of the content of higher education is a process that promotes the growing younger generation to become personnel in accordance with international standards. The requirement of higher education is the education of comprehensive, competitive and qualified values, in which the role of the assessment system is of particular importance.

Key words: evaluation criteria, innovative education, interactive approach, creativity, competence.

Introduction. In our country, special attention is paid to the development and improvement of alternative assessment criteria in the higher education system, in addition to teaching students foreign language skills. In the conditions of innovative education, a number of reforms are being implemented in all stages of the higher education system to teach students foreign language skills or further improve the teaching of foreign languages. For example, "The current policy of openness, foreign investments and the increase of new enterprises encourage our youth to learn modern knowledge and foreign languages" [1]. Therefore, in the conditions of today's New Uzbekistan, the formation of foreign language learning skills among young students is one of the important tasks at the level of state policy. It is in the implementation of these tasks that improving the professional skills of modern pedagogues and developing and improving alternative assessment criteria in the

higher education system is becoming a demand of the time. After all, in today's developed society, the supply of highly educated specialists who meet international requirements has become an urgent issue, in which there is a high demand for pedagogues to first develop their interest in teaching students foreign language skills, and then to form professional competencies such as evaluation of those skills by developing transparent and alternative evaluation criteria form the basis of assessment criteria in the education system.

Although a number of effective scientific research works on teaching students foreign language skills have been carried out in the higher education system today, it is becoming a demand of the time to conduct special, complex scientific research works based on the methodology of developing and improving alternative assessment criteria for teaching students foreign language skills.

One of the main tasks of education is to educate the young generation as a qualified person who has mastered modern knowledge and skills, knows foreign languages, and is able to apply the acquired knowledge in real life, as a specialist. After all, in the future, any person's development as a person, as well as as a specialist, choice of profession, fulfillment of dreams, first of all, depends on what kind of education he receives.

The rapid development of science is forming a new approach in higher education as well as in all educational institutions, which, in turn, imposes on pedagogues the task of developing new alternative methods and forming competence skills in students [2. P. 8].

Research Methodology. In the conditions of the new Uzbekistan, the education system, especially the higher education system, is deeply modernized and strives to compete with the ranking of higher education institutions of the world level. In this regard, changing the paradigm of education, updating its content, developing new approaches and new ideas is becoming the need of the hour. Also, in the education and training of today's young people in accordance with the requirements of the developed society, it is becoming one of the important issues for pedagogues to thoroughly master their pedagogical activity, its scientific foundations, to develop and improve new methods, rules and alternative evaluation criteria that form unique skills in students. Because today, one of the main tasks of higher education institutions is to develop students' abilities, talents, and positive attitudes towards the environment.

As today's education reform in our country is revived, the question of what kind of educational mechanisms to present to the future generation will be re-examined in international scientific centers and researches on the most effective methods of education will be analyzed, and scientific research will be carried out on adapting the educational program and pedagogical approaches used in its implementation to the needs of the times. One of the most important criteria in the implementation of such requirements is the evaluation criterion. Today's modern requirement of higher education is education of comprehensive, competitive and competent values. The role of the assessment system is incomparable in this, and the factor that establishes mutual understanding and collective relations among students, affects the formation of their cognitive competence, and expands the possibilities of students by eliminating their insecurity is the process related to assessment criteria.

Evaluation criteria is a system of measurements that implement specific science or educational goals, activities performed by students in the educational process and a system of its evaluation. In the educational system, the term criterion-referenced assessment is also widely used, and it is a process based on comparing the knowledge of students with specific criteria, developed by qualified pedagogues and experts, which corresponds to the purpose and content of education, contributes to the formation of cognitive skills and abilities of students.

The rules that students should know when learning foreign languages is also a topic that requires a separate discussion. In particular, when theoretical information is given in the practical course of the studied language, the student tries to apply the linguistic rules existing in his native language, and this process is eliminated by giving explanations specific to certain language rules so that it does not affect the alternative assessment criteria [3. P. 102].

In the higher education system, today's main attention is focused on the evaluation criteria in the educational process and the formation of a team of highly qualified professors and teachers, and

the development of their activities. In this case, not only quality control of education, but also ensuring its continuity and development is becoming the main issue. And the advantages of grading criteria are clear to students, apart from the complexity and traditionality of the grading system.

One of the main principles of today's education is the mechanism of regular, objective and correct assessment of the knowledge acquired by students. The components of the pedagogical process are the processes of teaching, teaching and training, as well as checking the results of control, that is, improving the criteria of evaluation or alternative evaluation. Because the alternative evaluation system is the main part of pedagogical control, it is a process that allows to identify achievements and shortcomings in a particular subject [4. P. 47].

The effective organization and effectiveness of the educational process in higher education institutions is evident in the regular assessment of students' knowledge, skills and abilities.

As students' knowledge and skills are monitored, the main focus is on the student's ability to use his speech activity in practice, that is, in the process of communication. Because the normative indicators of the ability to use that speech activity in the process of communication are evaluated through alternative assessment criteria. When it comes to the evaluation of students' knowledge in the higher education system, the main attention is paid to the types, nature and tasks of control (evaluation).

The main aspects of the advantages and priorities of criteria-based assessment are to improve the quality of teaching in higher education and to adapt the knowledge of graduates to international standards.

The main tasks of criteria-based assessment include:

- determining the level of preparation of each student in each part of the training;
- formation of the ability to achieve educational goals in a specific subject in accordance with the established program;
- monitoring and encouraging development of students' competencies and achievements;
- to identify mistakes and shortcomings of the student in the training process and to allow them to be corrected;
- ensuring fairness and transparency of assessment;
- includes provisions such as the analysis of the effectiveness of education conducted according to a specific curriculum [5. P. 14].

Conclusion/Recommendations. Alternative assessment criteria for teaching foreign language skills to students are different, and in some foreign studies, this process is noted as specific rules of assessment methods. In particular, the rules of assessment of the test system are a tool that helps to improve students' foreign language (English) skills and competence. Because the multiple-choice test process is a tool that interprets the correct or incorrect short answer or listening comprehension, that is, it is an alternative assessment of student knowledge through the working principle of other control methods such as short answers used in teaching and evaluating students' foreign language skills [6. P. 13]. It should also be noted that when evaluating students' knowledge, all methods of control should be suitable for the object of control, mastery of a particular subject or the studied language, and features of speech fluency should also be taken into account.

In conclusion, since the educational process aims to train personnel who can find solutions to the current problems of today's developed society, special attention is paid to the issues of attracting students to their field and encouraging them to become highly capable individuals. In particular, as in every field, it is one of the important rules of pedagogical practice to be able to correctly guide each person based on his competence and evaluate him properly.

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ISSUES OF CREATIVE IMAGINATION DEVELOPMENT IN NATURAL SCIENCE TEACHING

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Annotatsiya: Mazkur maqolada talabalarning ijodiy qobiliyatlarini shakllantirishning pedagogik, psixologik asoslari tahliliy bayon etilgan. Unda tabiiy fanlar ta’limi jarayoniga ijodiy yondashuv masalalariga urg‘u berilgan. Talabalarning tabiiy ilmiy savodxonligini oshirishda o‘quv-ijodiy faoliyatning mazmunli va texnologik elementlari, ijodiy qobiliyatlarni rivojlantirishda turli didaktik sharoitlarning ta’siri asoslangan.

Kalit so‘zlar: kognitiv qobiliyat, kreativ fikrlash, tasavvur, o‘quv-ijodiy faoliyat, refleksiya, tabiiy savodxonlik, innovatsion texnologiya, shaxsni rivojlantirish, reproduktiv, motivatsiya, konstruktorlik faoliyati, integratsiya.

Аннотация: В данной статье аналитически описаны возможности развития творческого воображения учащихся при преподавании естественных наук. Приоритет отдается подходам к организации творческих задач и игр, основанным на интеграции естественной грамотности. В его основе лежат методические рекомендации по поэтапному развитию творческого воображения учащихся.

Ключевые слова: творческое мышление, воображение, творчество, творческий сбор, мотивация, природная грамотность, явления природы, природные материалы, нестандартная мысль, уникальные идеи.

Abstract: This article analytically describes the possibilities of developing the creative imagination of students in the teaching of natural sciences. It prioritizes approaches to organizing creative tasks and games based on the integration of natural literacy. It is based on methodical recommendations for the step-by-step development of students' creative imagination.

Keywords: creative thinking, imagination, creativity, creative collection, motivation, natural literacy, natural phenomena, natural materials, non–standard thought, unique ideas.

Introduction. Many experts have emphasized the fact that children's imagination is much richer than that of adults. In order to effectively use such an opportunity and develop it further, it is necessary for teachers to provide various opportunities, give direction and create conditions for students to freely express their imagination. At the same time, success can only be achieved by systematically working with students on imagination. Intellectual and didactic games pave the way for the development of imagination and, accordingly, creative abilities in children, stimulate the activity of students in this regard. Tasks and games that help enrich the imagination allow the child to deepen and strengthen the valuable qualities of a person (courage, determination, organization, resourcefulness). Pupils learn to compare the appearance, situations, and activities of an imaginary situation with the real life situation, learn to make a comparative analysis, pay attention to the

differences between imagination and life, and develop the ability to see a problem and give ideas about its solutions.

Tasks and games that develop children's imagination can be organized outside of school hours. Helping the hero who is facing a problem, developing tasks related to solving problems related to these situations, providing solutions for getting out of the situation by visually reflecting the situations in the forest, desert, mountain, sea environment in the form of various pictures, video films, all this stimulates mental activity, to the topic develops interest, feelings, imagination. Future teachers are required not only to find solutions to such situations, but also to develop creative abilities to create such situations.

Creative games and tasks also help the teacher to unite the children's team and involve closed and shy children in active activities. In games, the teacher gets to know the character and habits of his students more easily, which allows him to find the most appropriate ways to influence each child.

When organizing games, the teacher should ensure that the purpose of the games is only to ensure that children spend their training time in an interesting way, to have an educational and developmental effect, and at the same time to perform tasks corresponding to the curriculum [1-10].

Discussion. The teacher should have a variety of plot, logical, didactic games and creative assignments on the subject. It is a very important task to carefully monitor students' visual and auditory memory, creative imagination, the world around them, to develop new and different interesting tasks that teach them to understand it, to enrich the methodical system of this activity with specific materials. In the development and organization of tasks and games, it is necessary to pay special attention to the age of children, their abilities and development. It is assumed that the content of the games that the teacher plans to work with children will help children to strengthen and expand their knowledge, as well as help them develop their personal qualities such as imagination and resourcefulness. It is also important that assignments or games are organized in a free and voluntary environment as much as possible, and that they are not perceived by children as a forced learning process. In this place, organizational and diplomatic qualities are required from the teacher. In the organization of creative tasks and games, the elements of incentive and competition are always considered very important. Stimulating one type of creativity (verbal) in the formation of imagination serves as an impetus for the development of other (artistic, musical) types. Every child has unique abilities and talents, and they are naturally curious and eager to learn. Only the skills of the teacher and an effective methodical system are needed for them to demonstrate their talents. It is known that the elementary school period is a very important period in the development of a child. It is during this period that the basis for preparing children for creative work is created, imagination, creative thinking develops, curiosity, observation, analysis, comparison, summarization of facts, and the ability to draw conclusions are cultivated. "A student is not a vessel to be filled, but a torch to be lit" [Y.L. Lviv, "Teacher's Creative Laboratory"]. If the educational activity of students in the classroom brings them joy, satisfaction and academic success, it becomes a great motivational force for the student. Educational tasks that stimulate mental activity, optimize mental activity skills, form the knowledge field hygiene, skills and determine its character play an important role in the development of creative thinking of primary school students. The quality of further education and upbringing of a person largely depends on the success in the development of creative abilities. Therefore, tasks to develop creativity and logical thinking are required in all lessons. This, in turn, requires a great creative potential from primary school teachers. It is possible to achieve positive results through the implementation of various research works on the development of creative abilities of future teachers in the system. For each lesson, a methodical method that develops students' constant interest in learning and the need to independently search for it, the desire to joyfully and successfully implement their educational process, willingly participate in various science olympiads and get stronger motivation by winning prizes. educating teachers capable of developing systems is an urgent issue. According to L.S. Vygodsky, "The most important education in childhood is the education that causes the child to develop himself and move forward." Creativity is one of the skills that is important to develop in the educational process.

Creativity, creativity and fantasy are concepts related to the ability of a person to express himself and create new ideas, but they have different meanings and characteristics. Creativity is a broader concept that encompasses a person's ability to create something new, original, and valuable. This ability can cover art, literature, music, science, business and other areas of life. Creativity can take many forms, including discovery, innovation, design, art, and more. This often requires a unique way of thinking and the ability to see connections between different ideas.

Creativity is the ability to think "out of the box" to find non-standard solutions, approaches and ideas. Creativity can be used in many different fields, but it is often associated with the process of solving problems and finding innovations. Creativity can be taught and developed through practice and exercise.

Imagination is the ability to create imaginary images, ideas, and scenarios in the mind without any real basis or limitation. Imagination can be an important component of both the creative process and play. It allows people to explore different possibilities and experience inner worlds that may be abstract or mysterious.

In the teaching of natural sciences, natural phenomena, natural processes (cloud formation, fog, rain, snow, dew, frost, wind, day and night, change of seasons, sun, moon, stars, rainbow, lightning)) on the basis of a creative approach to studying the cases related to them, development of appropriate methodical system and materials and appropriate use will effectively affect the development of creative abilities of students along with increasing natural literacy.

When understanding the nature of water circulation, rain, cloud formation, and types of clouds, it is appropriate to give students creative tasks to independently observe, photograph and collect clouds of different forms, compare clouds to different objects based on their imagination, and draw their pictures. . Such assignments help to embody the educational, educational, and developmental activities of the training.




Figure 1. Samples from "Creative Collection of Cloud Images"

Fantasy is the ability to imagine, the ability to create new images, images, ideas. Imagination is an integral part of the creative process and helps people express their thoughts and ideas in different ways.

Everyone has an imagination, but some are more developed than others. People with a developed imagination are often prone to creativity and inventions, and they can create unique ideas and concepts that can be used in various areas of life, in science, art, technology and other areas.

Imagination helps not only to create new and original things, but also to solve various problems and find new solutions. People with a developed imagination can use it to create new technologies or cures for diseases. In general, imagination is an important element in our lives, helping us to develop and find new ways to solve problems.

Conclusion. In general, creativity, creativity and fantasy are related and can complement each other, but each of these concepts has its own characteristics and contexts of application. Creativity can be the result of creativity and include elements of fantasy, but it can also manifest itself in a wider range of activities.

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POSSIBILITIES OF USING DIGITAL TECHNOLOGIES IN FORMING THE PROFESSIONAL COMPETENCE OF STUDENTS

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Annotatsiya. Ushbu maqolada talabalarning kasbiy kompetentligini shakllantirishda raqamli texnologiyalar va ulardan foydalanish imkoniyatlari yoritilgan.

Kalit so‘zlar. Kompetentlik, kasbiy kompetentlik, raqamli texnologiya, raqamli texnologiyadan foydalanish.

Annotation. This article describes the possibilities of digital technologies and their use in the formation of students' professional competence.

Keywords. Competence, professional competence, digital technology, use of digital technology.

Introduction. In the Insheon declaration of the world's international educational organizations, it is recognized that: "It is necessary to use new information and communication technologies to strengthen the education system, spread knowledge, use various information, organize high-quality and effective education" [1].

In fact, the modern development trends of the society, the development of computer technologies, the process of globalization and informatization have not failed to affect all areas, including education.

Identifying new possibilities of using computers in the educational process and putting them into practice, forming the skills of students to perceive existence on the basis of virtual tools is one of the important factors of effective organization of educational processes.

Literature review. In our country and abroad, the search for new educational models is intensively conducted, in which the level of innovative approaches to the organization of education based on the wide and active use of information and communication technologies as a moving force of modernization in the entire educational process is considered.

In the countries of the Commonwealth of Nations, scientific research has been conducted on the improvement of the education system and the use of innovative technologies in the educational process. In addition, the theoretical and methodological foundations of the development and improvement of the methodology of using modern information and communication technologies in the educational process have been expressed in the research works carried out by a number of scientists. In particular, S.A. Beshenkov, A.G. Gain, A.V. Goryacheva, V.A. Kaymin, A.G. Kushnirenko, M.P. Lapchik, A.S. Lesnevsky, N.V. Makarova, G.K. Selevko, I.G. Semakin, T.A. Boronenko, V.V. Davidov, YE.S. Kuznetsova, N.D. Ugrinovich Research papers on the theory and practice of introducing information and communication technologies to education in developed countries and the problems of using digital technologies P.Alfred, K.C.Barker, A.Kameas, J.Leng, T.Monaha, S.Thakral, D.Fällman, A.conducted by scholars such as Šorgo.

The scientists of our republic have also carried out a number of scientific researches on the

problems of teaching using information technologies in higher education, creating modern educational literature (textbooks, study guides, monographs), didactic tools and conducting their examination. , scientific research was conducted on the problems of creating and using pedagogical software tools in education, methods of using digital technologies in the educational process, and the problems of using distance learning technologies, and a number of scientific articles were published. Among them, A.A.Abduqadirov, Q.T.Olimov, M.M.Aripov, T.R. Azlarov, B.Begalov, U.Sh.Begimkulov, F.M.Zokirova, R.R.Boqiyev, N.I.Taylakov, S.S.Gulomov, U.Y.Yuldashev, A.Sattorov, B.B.Mominov, F.R.Muradova, A.Ashirova, I.Isakov, A.M.Polotov, M.A.Fayziyev, A.G.Hayitov, found its explanation in the scientific research works.

Research methodology. In the age of information technology, the motivation to use interactive methods and tools, pedagogical, innovative and computer technologies in education is increasing every hour, the main reason for this is that students in traditional classes are focused only on acquiring existing knowledge. now, with the help of new technologies, they are taught to search for information by themselves, study independently, analyze and draw conclusions [2].

Especially in this regard, the problem of creating educational resources based on digital technologies is of particular interest to researchers.

According to Gilyarevsky, the e-learning environment has a number of advantages, including the interactive nature of communication; use of materials in the systems by Internet users; dynamic update of content, large amount of information: presentation of files in the form of line, image, audio and video; find quick information; created portals should be provided with opportunities to obtain information about users [3].

In the use of information and educational content, the system interface should be simple and systematic, and its dissemination should satisfy the requirements for the electronic educational environment in this development:

Didactic requirements. Provide scientifically reliable information; to have information about the latest achievements of science, technology and technology; taking into account the age and individual aspects of the system user, there should be opportunities for acquiring knowledge, creativity, free research, working on oneself, acquiring new knowledge; problem-based teaching, presentation, awareness, user independence and interactivity of teaching; Systematization and recommendation of presented educational information, the purpose and task of the lesson, content, interactive methods, educational tools, theoretical and practical lessons; the presence of a complex of tasks of different levels of independent assimilation and strengthening of information, creative approach, orientation and development of practical tasks, formation of knowledge, skills and qualifications of students; Due to the fact that the basic knowledge level of the users of the system is different, it is necessary to take into account the development and educational functions suitable for each user [4].

Methodological requirements. Taking into account the specific features of the academic subject; provision of comprehensible, figurative and dynamic components in the presentation of educational materials; interdisciplinary logical sequence and integration; It is necessary to organize various types of controls so that the user of the system can systematically master the educational materials [5].

Psychological requirements. Taking into account the verbal-logical aspects of understanding the presentation of educational information from information-educational content; concentration, creation of motivation, retention in memory, imagination, creation under control of the age and individual psychological processes of system users; There should be no excessive excitement, nervousness, and mental load when learning information [5].

Technical requirements. The created system should have technical support; modern computers, business and peripheral devices; includes internet network services, domain, hosting, etc. The information-educational content should correspond to the level of the material and technical base of HEIs; hash should be an interface with a semantic structure convenient for untrained and professional users; support of modern browsers; Web development tools, HTML5, SSS and JavaScript elements should be used in the development of site pages [5].

Aesthetic requirements. Educational materials should be presented in an orderly manner; the placement of educational materials, the font size and style should not tire the eyes, the text colors should be comfortable for reading the content; the background of the site pages should be selected at the required level, the color palette on the site should be harmonious and compatible with the blocks; that the presentation of images and animations does not tire the student; the general design should take into account the age and psychological conditions of the students based on the theme of the system.

Ergonomic requirements. Creating a system aimed at forming students' relationships with the world, people, and each other in accordance with pedagogical goals need; There should be a cultural and creative environment to adapt students to changing living conditions [6].

Creating information-educational content, first of all, it is necessary to design and implement it, to put it on the Internet and to implement technologies of virtual tours and forms of interactive communication, in short, to develop an algorithm [7].

Active learning methods. Currently, active teaching methods are widely used. The use of these methods requires careful preparation from both the teacher and the audience. Among the personal qualities of the listener, we pay special attention to the characteristics of the person, such as the independence of knowledge. It should be considered as a necessary quality, "it is manifested in the desire and ability to master the basics and methods of self-activity and apply them in educational and practical activities to prepare for professional activity."

Creative direction is a synthesis of personality traits and its cognitive abilities, motivational and cognitive characteristics; intellectual activity is a sufficient unit reflecting the process of interaction of these features. Undoubtedly, at the current stage of reorganization of higher and secondary schools, it is necessary to proceed from the fact that "creativity is not a separate aspect of pedagogical work, but its most important and necessary characteristic." It seems that creative attention is an important component of active forms and methods of teaching [5].

The pursuit of a profession is closely related to the creative direction, which consists of a constant focus on professional interests, needs, a stop on the practical application of all the things learned, all the information received . The professional pursuit of training necessarily includes the "natural possession of knowledge" and the student must apply this knowledge not in isolation, but in unity and interdependence. Professional aspiration can be considered as such a quality of a person necessary for cognitive activity, because taking into account the future or current specialty is a strong incentive for motivational activity. Thus, professional aspiration can be considered as an important quality of a specialist's personality.

Active methods of teaching, project method, joint learning (creative curriculum, project method, cooperative learning) are widely used in new information technologies.

Creative teaching method. Creative teaching is based on the following principles:

- the basis of creative training is the intended educational product created by the student;
- the principle of conformity of the external appearance of the student's educational product with his internal needs (permanent diagnosis of personal educational growth);
- the principle of the student's individual educational trajectory in the educational space;
- the principle of interactivity of classes conducted with the help of communication tools;
- the principle of open communication regarding the educational products created by the student;
- the principle of compliance of educational procedures with communication forms and technologies.

Blended learning method means organization of educational process based on combination of computer graphics, audio and video, special information technologies, interactive methods, traditional education with electronic education.

Coaching method - translated from English - means instruction, coaching, training, training with a tutor. This technology is a technology that helps to give instructions for special purposes, to develop personal potential, self-awareness and sense of responsibility in a person engaged in professional activities.

The flipped classroom method is one of the modern methods of teaching, which means "inverted classroom" when translated from English, and it is possible to form students' interest and motivation towards science by replacing classroom work and homework. This method of technology is distinguished by the fact that a new topic is given in the form of homework, and discussion of the topic, problem situations, and finding solutions to questions are carried out in the classroom.

Design thinking method is a method of solving engineering, business and other problems based on a creative approach rather than an analytical approach. The main feature of design thinking, in contrast to analytical thinking, is not critical analysis, but a creative process, in which sometimes the most unexpected ideas lead to the best solution to a problem. Based on this method, it is possible to develop students' creativity, initiative, and creative ability.

The method of sonsulting is derived from the Latin word "sonsultio", which means gathering, consultation. Based on this method, it is possible to provide assistance, advise and solve the problems of the interested organization by an independent person who has the necessary powers in the field of research.

Project-Based Learning is a project-based learning method in which students participate in real, important and meaningful projects. Students work on projects for extended periods of time, answer interesting and challenging questions, or learn to solve real-world problems through research, inquiry, and critical thinking. The project method is based on the development of students' knowledge and creative abilities, the ability to independently design their own knowledge, the ability to act in the information space, free thinking, planning, creating independent projects, finding alternative solutions for solving given tasks, and developing critical thinking.

Problem-Based Learning method means problem-based learning method when translated from English. This method is based on the process of finding a solution to a specially formulated problem. The problems are structured in such a way that in the process of solving them, students refer to the theoretical material that should be mastered in the program. Thus, the teacher no longer provides the information and knowledge that the students need to learn, but poses a problem and guides the classroom discussion on problem solving and, if necessary, guides the students. During the lessons, students independently learn the necessary and necessary information on the subject and find ways to solve the problem. Often, problem-based learning is aimed at several lessons. First of all, the teacher introduces students to the nature of the problem, discusses together how it can be concretized and divided into small tasks, and most importantly, the knowledge and skills to solve the problem are already there. In the second lesson, solutions to the problem will be discussed based on previously learned information. In the third lesson, students talk about how they solved the problem and the obstacles they encountered in solving the problem and how to overcome them.

Coorerative Learning method means cooperative learning, and it is a method for students to study in groups and in cooperation. With this approach, students achieve educational success only by communicating with each other. When using collaborative learning methods, students are faced with the need to express their thoughts orally and argue their statements. They learn to look at the problem from a different point of view.

Analysis and results. Pedagogical conditions for the use of digital technologies in the formation of the professional competence of students include independent learning, self-control, the introduction of factors influencing cognitive activity in the process of working on relevant information in the form of mutual integrative functions, and the use of digital technologies in the formation of the professional competence of students. didactic possibilities were determined based on the optimization of methods that teach structural editing of digital information in optimal combinations with professionally oriented graphic design tasks.

Conclusions and suggestions. Scientific research on improving the teaching methodology using digital technologies in the development of professional competence of students in higher education made it possible to make the following conclusions:

1. As a result of the study of the state of training of specialists in higher education institutions and the requirements for their professional training, the need to create and use modern software tools for the purposeful training of future specialists was justified.

2. In the teaching of Informatics and digital technologies in higher education, it was justified that digital technologies have a positive effect on the development of students' intellectual ability and cognitive activity:

- Formation of theoretical knowledge and practical skills in "Informatics and digital technologies", students' ability to think creatively

independent learning, development through the use of telecommunication tools.

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DEVELOPMENT OF CREATIVE ABILITY OF PRIMARY CLASS STUDENTS

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Annotasiya: Maqolada boshlang‘ich sinf o‘quvchilarida ijodiy fikrlashni rivojlantirish. Ijodiy fikrlashning mohiyati haqidagi savolga nazariy pozitsiyaning asoslanishi berilgan. Sinfdan tashqari ishlar tizimida ijodiy fikrlashni rivojlantirishning psixologik va uslubiy asoslari ko‘rib chiqiladi, u o‘qituvchilarga ijodiy fikrlashni rivojlantiradigan maktab o‘quvchilari uchun sinfdan tashqari mashg‘ulotlar dasturlarini mustaqil ravishda ishlab chiqishda yordam berish uchun mo‘ljallangan.

Kalit so‘zlar: ijodiy fikrlash, sinfdan tashqari ishlar, tashkiliy usullar, boshlang‘ich maktab, boshlang‘ich sinf o‘quvchilari.

Аннотация: В статье рассматривается развитие творческого мышления у учащихся младших классов. Дается обоснование теоретической позиции к вопросу о сущности творческого мышления. Система внеклассной деятельности рассматривает психолого-методические основы развития творческого мышления, которая призвана помочь педагогам самостоятельно разрабатывать программы внеклассной деятельности для школьников, развивающих творческое мышление.

Ключевые слова: творческое мышление, внеучебная деятельность, организационные методы, начальная школа, учащиеся начальных классов.

Abstract: Development of creative thinking in elementary school students in the article. The rationale of the theoretical position is given to the question of the essence of creative thinking. The system of extracurricular activities examines the psychological and methodological foundations of the development of creative thinking, which is designed to help teachers independently develop programs of extracurricular activities for schoolchildren who develop creative thinking.

Keywords: creative thinking, extracurricular activities, organizational methods, primary school, primary school students.

Introduction. Currently, society's need to educate and train creative people has become acute in a world with a non-standard view of problems and an adequate and quick response to changes. That is why many philosophers, psychologists, sociologists and teachers both in Uzbekistan and abroad have intensified their research on the problems of creativity, creativity and creative thinking.

Different points of view are studied from these phenomena: theories of personal creativity and development programs, creative thinking develops. Attempts to develop the conceptual apparatus of the research, existing concepts under consideration, create "portraits" of the creative personality of a person, study creative thinking and creativity. Different existing definitions of creative thinking (productive, heuristic, independent, divergent, creative) reflect the complexity of this psychological nature. The process and therefore it is impossible to develop common standards and development strategies for all its manifestations[1]. This way of thinking mainly depends on the overall educational system followed. Currently, the explanatory-illustrative method dominates the educational process in primary school. Its essence is true: the teacher transmits the ready-made "system of knowledge" provided for in the program, and the student perceives the story, learns the relevant material from the textbook and retells it. Thus, it turns out that the elementary school student is not included in the process of active research, "discovery" of new events and facts, that is, traditional education takes place.

The goal should be to develop the creative thinking of elementary school students. It should be noted that the most sensitive period for children of primary school age is the development of creative thinking [2]. Therefore, the development of creativity, using methods that encourage the development of important students already in school, thinking in a person is active creative thinking, flexibility of reasoning, speed and originality of answers. Creative thinking develops only when students face learning problems. Productivity of ready-made patterns of thinking depends on the creation of an optimal working environment, defining creative thinking as one of the types of thinking characterized by a creative environment, the creation of subjective new products and new formations in the cognitive process is the activity itself, we believe in the effective formation and development of creative thinking. It is necessary to organize a form of free creative activity and communication. Must perform often different from those organized in educational settings. The activity of elementary school students creates this non-traditional technology and contributes to the development of an atmosphere of comfort, openness, and softness[3].

Literature review. Pedagogical creativity is a new discovery in the field of pedagogical activity. It can be innovation - an unconventional way of solving problems, and innovation - the use of new methods of teaching in a new environment. Finding an unexpected pedagogical solution and using it in specific situations is called improvisation and is common. Creativity as a phenomenon first became the subject of research in the 20th century. Some aspects of this phenomenon existed in the 60s and 80s. The subject of study of philosophers (M.S. Kagan, P.F. Kravchuk, etc.), psychologists (D.B. Bogoyavlenskaya, L.B. Ermolaeva-Tomina, Yu.N. Kulyutkin, A.M. Matyushkin, Ya.A. Ponomarev, etc.), pedagogues (L.A. Darinskaya, I.P. Volkov , E.A. Glukhovskaya, A.I. Sannikov and others). From a philosophical point of view, the concept of "creativity" means human talent, his ability to be active and is interpreted as the realization of high moral ideals and striving for them. There is a lot of information about creativity in the psychological and pedagogical literature, which is characterized as a set of qualities of personal activity, skills, abilities, a person's ability to perform creative activities, the ability to communicate with people and nature[3].

Significance/need of the study. Several main approaches to the problem of creative abilities can be distinguished[5]:

- creativity is an activity that is not stimulated by the situation;

- there is no such thing as creative abilities. Motivations, values, and personality traits play a major role in determining creative behavior;

-creative ability is an independent factor independent of intelligence;

-a high level of intelligence requires a high level of creative abilities and vice versa. There are still no unequivocal answers to these questions in the scientific literature.

Also, the following questions arise by themselves:

- ✓ why do the same people show mostly adaptive activity and others positive activity?
- ✓ why the creative activity of the same people is more productive than that of others?

When V. Ostwald was creating a typology of creativity at the beginning of the 20th century, the criterion of originality of scientists' creativity was "the ability to create something independently." J. Guilford believes that the existence of divergent thinking is the basis of creativity as a general creative ability. Most modern researchers follow this idea. Torrens considers creativity to be a sharp perception of gaps in knowledge, gaps, disharmony, etc. He believes that the creative act consists of perceiving a problem, searching for a solution, generating and expressing hypotheses, testing hypotheses, modifying them, and finding a result. Ya. A. Ponamarev believes that creativity as a psychological characteristic is intellectual activity and sensitivity (brought to sensitivity). For a creative person, side, additional results of activity, something new, unusual are of the greatest importance. S. Mednik believes that both convergent and divergent organizers participate in the creative process. According to S. Mednik, the essence of creativity is not in the nature of operations, but in the ability to overcome stereotypes at the last stage of intellectual synthesis, in the breadth of the field of associations[6]. According to the sources, the concept of "Creativity" was introduced into general scientific circulation by Aristotle. In the modern science of creativity, it is observed that this concept is somewhat vaguely interpreted. For example, in some sources, it is defined as "the level of opportunities", and creativity is characterized by saying that it is a combination of attitudes, necessary tools, and opportunities. In the "Explanatory Dictionary of the Russian Language", creativity is figuratively defined as "the sum of all the qualities and qualities that should be present in a person", and in some pedagogical studies, the term "creativity" is used as the realization of internal forces and as are used and appear as opportunities for the participants of the pedagogical process. According to our observations and analysis, it is observed that the components of the creative potential of a person are developed depending on the understanding of the essence of the concept proposed by the authors. That is, each author offers his most expressed components of creativity and puts them forward as important concepts in the process of creative activity[6].

Research methodology. Children's initiative and independence creates a positive emotional attitude towards him. To create a state of activity, success, to develop the creative thinking of elementary school students, there are various types of extracurricular activities for teachers today: game, cognitive, problem value, communication, recreational communication, artistic creativity, social creativity, tourism and local history, etc. We invite the scientific community to consider a form of post-school education that can integrate all fields. It has an emotional-aesthetic, cognitive, general cultural, creative direction, which is based on the interaction of the interests of adults and children[5]. Circle activities include the optimal ratio of early childhood processes: knowledge, work, free communication and play - this is what holds the entire foundation of a developing person. In addition, the circle is a form of democratization of school life and an exciting way to direct the social activity of children, a form of their inclusion in collective activities. To eliminate the "gap" between the school circle, the team is children and adults; mutual aid in development, serves for change. In creative thinking based on self-management of oneself and the surrounding world, from the point of view of the child's circle activity, first of all, features such as fluency are manifested - the ability to give the maximum number of ideas that arise in a unit of time; flexibility - the ability to express different opinions; originality - the ability to create new things, standard ideas; independence - the ability to work independently without the help of others; the level of awareness of the task being performed is reflected.

In primary school, the formation of the child's creative thinking is carried out step by step. Creative, when a person has the ability to create new, unique things. In the process of successfully acquiring knowledge and skills, a person moves from one level of development to another[7].

Primary education is the best time for developing students' creative abilities. This requires the creation of favorable conditions for the formation of children's creative abilities in various directions, including artistic, musical, technical, etc. during the educational process. The conditions for the formation of creative abilities include[7]:

1. Physical and intellectual development of primary school students.
2. Creating a favorable environment for the development of students.
3. The student's ability to independently solve the assigned tasks, using all his knowledge and capabilities for this.
4. Freedom to choose the type of activity, change the workload and the nature of the work to be performed.
5. To provide support in difficult times, to help the student to make the right decision, not to make it for him.
6. Stimulating the student's creative initiatives and hobbies.

In order to develop creative abilities of students, it is necessary to create favorable conditions both at school and in the classroom. In order to develop the creative potential of students in the school, it is necessary to carry out the following activities[6]:

• Inclusion of extracurricular activities aimed at developing students' creative abilities into the educational program of the educational institution.

• Using methods and forms of working with children that contribute to the development of their creative potential.

• Organization of work with parents, development of an algorithm of mutual cooperation of teachers, students and parents in the framework of creative activities

In order to educate a creative person at school, it is necessary to pay attention to the methods of organizing the educational process aimed at developing the mental activity, diligence and intelligence of the student, to encourage the student to independently search for the knowledge necessary to achieve the goal. The nature of work aimed at developing children's creative potential can be changed depending on the situation. We will consider ways to develop creativity in children in different conditions[4].

1. Development of creative skills in class.

It is possible to organize children's creative activities during classroom lessons and activities by involving students in preparing messages, writing essays, creating crosswords and quizzes, and writing stories and scripts on the topic being studied. Also, the teacher can use didactic games and methods, creative assignments aimed at forming students' creative thinking and developing cognitive interest. Today, in order to develop the creative abilities of students, computer technologies are widely used in order to attract the attention of students and conduct the lesson interactively.

2. Development of creative skills in extracurricular activities.

One of the main tasks of extracurricular and extracurricular activities is to expand the national and special knowledge of students, to identify and develop various creative abilities and talents, and to nurture the qualities of initiative and independence in them. Organizing and conducting extracurricular activities at school is positively received by children, it allows them to be free and use their creative abilities. Creative activities outside the classroom include themed weeks, organization of excursions, holiday events, creative competitions. In the process of conducting extracurricular creative activities, the student becomes a direct participant in the pedagogical process, develops and forms the skills and abilities of establishing personal relationships with the teacher and the team, organizing joint activities.

3. Development of creative skills in clubs and contests.

Circle classes are the most convenient way to develop students' creative abilities. Science clubs arouse students' interest in academic subjects, develop students' outlook, contribute to students' acquisition of independent work skills, and increase the level of knowledge in science[3].

Analysis and results. Development and special techniques are used. We assume that from a circular point of view, a system of classes for children is necessary for the sake of interests. First of all, it is important to develop the fluency of thinking, then flexibility, and only then to develop the originality of thinking.

Traits such as task awareness are developed while working on fluency, flexibility, and individuality. The organization of free communication in the conditions of the circle implies that the teacher has a plan to create a group of students with unique characteristics, which helps in self-awareness and in the protection of the child, as well as the development of personality. This system is good because the students are involved in activities that are fun because they are designed and planned by themselves. In the process of this initiative, the interests and upbringing of children, not adults, are carried out. This transformation is the formation of a person. The development of a personal mechanism is a competition of creativity, ideas in all its forms, from co-creating valuable things to realizing them in concrete works. It should be noted that creativity is everything, based on children's abilities, they create different realities and reflect it in real life. Also, motivation for action arises through the promotion and exposure of "small talents"[5].

Thus, we believe in purposeful development of creative thinking. For children of primary school age, the pedagogic system of activities of extracurricular clubs is necessary to democratize school life, aimed at humanizing interpersonal and creative relations, within the framework of which a continuous joint process of creative activities of teachers and students and parents is organized. the characteristics of students of the inner class are taken into account and the activities of children of different ages are activated. It can be seen that in order to develop the creative thinking of primary school students, changes are needed in the education and training process of primary classes. We are convinced that the organization of school club activities requires a professional. A teacher who cannot be a teacher, who can organize extracurricular activities at the same time, is a person armed with the knowledge of creative thinking and the psychology of a primary school student who can organize diagnosis and elementary it is necessary to develop the creative thinking of students of the inner class[6].

Conclusion. As the question of developing students' creativity is always important, the forms, methods and tools used in these processes are always important. As education at the school level is considered the foundation of students' learning, if it is permissible, in these processes, it is necessary to develop creative activity in students in the first periods of learning. Therefore, the development of students' creativity and the need to further improve creative activity should be a problem on today's agenda. After all, it is important to develop the creative abilities of students in the early stages of learning, to take into account the young characteristics of students in improving their creative activities, to conduct lessons in an unconventional way in the effective organization of education, to use innovative methods in lessons, today's education it is important to refer to the most advanced forms, methods and tools active in the systems. Because the development of students' creative abilities and the further improvement of their creative activities serve to make them mature in all aspects.

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THE PSYCHOLOGICAL SIGNIFICANCE OF SOCIAL INTELLIGENCE IN THE SOCIAL LIFE OF YOUTH

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Annotatsiya: Ushbu maqola ijtimoiy intellekt yoshlarning ijtimoiy o'zaro munosabatlari va munosabatlariga qanday ta'sir qilishini ko'rib chiqadi. Adabiyotlarni kuzatish orqali biz yoshlar o'rtasida ijtimoiy intellektni oshirish yo'llari va uning shaxsiy rivojlanish va ijtimoiy farovonlikka ta'sirini muhokama qilamiz.

Kalit so'zlar: ijtimoiy intellekt, yoshlik, shaxslararo munosabatlar, hissiy intellekt, muloqot qobiliyatlari, psixologik farovonlik.

Аннотация: В этой статье рассматривается, как социальный интеллект влияет на молодежь в социальных взаимодействиях и отношениях. Изучая литературу, мы обсуждаем способы улучшения социального интеллекта молодежи и его влияние на личностное развитие и социальное благополучие.

Ключевые слова: социальный интеллект, молодежь, межличностные отношения, эмоциональный интеллект, коммуникативные навыки, психологическое благополучие.

Abstract: This article is considering how social intelligence affects youth's in social interactions and relationships. By observing literature, we discuss the ways to improve the social intelligence among the youths and its implications for personal development and social well-being.

Keywords: social intelligence, youth, interpersonal relations, emotional intelligence, communication skills, psychological well-being.

Introduction. Adolescence is a critical stage of development where individuals navigate a complex landscape of social interactions. As we know, social intelligence includes emotional understanding, effective communication and interpersonal skills, plays a crucial role in shaping the social life of young generation. This article discussed the psychological importance of social intelligence in the social life of youths. Many studies emphasize the positive correlation between social intelligence and the quality of interpersonal relationships among young people. Aggarwal, J.C. argues adolescents with high social intelligence demonstrate good emotional regulation, empathy, and conflict resolution skills, contributing to healthy social dynamics. In addition, social intelligence is related to academic success, showing its multifaceted effects on various aspects of a young person's life [1].

To better understand the relationship between social intelligence and youths' social life, we use the literature review methodology. Peer-reviewed journals, academic databases, and relevant publications are systematically analyzed to gather insight into the current state of research on the topic.

Analysis and Results. Social intelligence plays a crucial role in the social development and well-being of young people. Aggarwal, Y.P. underlined the social intelligence refers to the ability to understand, navigate and effectively communicate with others in various social situations [2]. In the context of youth, it has special psychological significance for several reasons:

Formation of social relations:

- Youths are at the stage of life form and strengthen social ties. Social intelligence helps them build and maintain positive relationships with their peers, family, and other important people in their lives.

Formation of social relations during youth is a crucial aspect of personal development. Some important points to consider in the formation of social relations in youths:

1. Personal development

- During adolescence, individuals are in the process of forming their personality. Social interactions play an important role in this process, as young people learn about different aspects of themselves through collaboration with others.

2.Peer Relationships

- Peer relationships become increasingly important during adolescence. As Best, W., & Khan, V. said "young people often seek acceptance and validation from their peers, and these interactions help develop social skills and emotional intelligence" [3].

3.Family Dynamics

- Although peers are important, family relationships continue to play a decisive role in the formation of social bonds. Family dynamics significantly influence young people's understanding of relationships, communication skills, and emotional support systems.

4. Forming close friendships

- Chellamani, K. (2007) in his work called "Learning Centered Classrooms: Metacognition Targets" notes the followings: Through developing the youths' social skills, we can often form close friendships among them which provide emotional support, companionship, and a sense of belonging. These relationships contribute to a sense of security and well-being. [4].

5.**Romantic Relationships**

- Adolescence is also a time when romantic relationships can emerge. At this stage, it is very important to understand the complexity of close relationships and develop the ability to communicate effectively.

6. Impact of technology

- In today's digital age, technology plays an important role in social communication. Dogan, T., & Cetın, B. argued that, the social media platforms and online communication channels provide additional opportunities for youth to connect, share experiences, and build relationships [5].

7. Navigation problems

- Building social relationships involves dealing with issues such as peer pressure, conflict, and differences of opinion. Developing resilience and problem-solving skills are essential to maintaining healthy relationships.

8.Effects on mental healt

- The quality of social relationships formed during youth can have a significant impact on mental health. Govil, P. underlined a positive relationship contribute to a sense of belonging and emotional well-being, while negative or strained relationships can lead to stress and emotional distress [6]. The formation of social relations in youth is a dynamic and effective process that shapes various aspects of a person's life. Developing social intelligence, building positive relationships, and managing the complexities of social interactions contribute greatly to personal growth and well-being.

9.Emotional regulation

- Social intelligence contributes to emotional regulation, helping young people understand and manage their emotions in social interactions. This skill is essential for building resilience and coping with the challenges that often arise during adolescence.

10.Gaining empathy and perspective:

- Social intelligence includes the ability to empathize and take the point of view of others. As Hackworth, C. A., & Brannon, L. A. claimed that "young people should understand different points of view, to develop compassion and build deeper connections with their peers" [7.].

11. Communication skills:

- In point of view, effective communication is a key component of social intelligence. Young people with strong social intelligence can express themselves clearly, actively listen and interpret non-verbal signals, and improve their ability to communicate thoughts and feelings.

12. Dispute resolution:

- Adolescence often causes conflicts and disagreements. Social intelligence equips young people with the skills they need to manage conflict constructively, develop problem-solving skills, and de-escalate conflict.

13. Peer acceptance and social integration:

- Socially intelligent individuals are often more adept at understanding social norms and guidelines, making it easier for young people to integrate into peer groups. This sense of belonging is essential for self-esteem and mental well-being.

14. Cognitive and academic benefits:

- There is evidence to show that social intelligence is positively related to cognitive abilities. Strong social skills can contribute to improved academic performance because they often involve effective communication, collaboration, and problem-solving.

15. Preventing social isolation:

- Socially intelligent youth engage in more positive social behaviours and avoid behaviours that may lead to social isolation. Building and maintaining relationships with others can provide a support system that is essential during difficult times.

16. Preparation for adulthood:

- Development of social intelligence in youth serves as a basis for successful adulthood. As individuals move into the workforce and independent living, strong social skills are increasingly important to professional success and personal life.

Social intelligence is a key component of youth development and affects many aspects of their lives. It contributes to emotional well-being, positive relationships, academic success, and the acquisition of important life skills. Encouraging the development of social intelligence in young people can have long-term positive effects on their psychological and social outcomes.

A discussion section interprets the results in the broader context of adolescent development. It examines potential factors that influence the development of social intelligence, such as parenting styles, educational environments, and exposure to various social experiences. Additionally, the unit examines the impact of social intelligence on long-term outcomes, including mental health and future career success.

Conclusion. The evidence presented in the article emphasizes the important role of social intelligence in shaping the social life of young people. As a key component of emotional intelligence, social intelligence contributes not only to immediate social satisfaction but also to long-term personal and professional success.

To increase social intelligence in youth, educators, parents, and policymakers should consider incorporating social-emotional education programs into school curricula. Encouraging open communication, fostering empathy, and creating opportunities for diverse social interactions can further support the development of social intelligence in young individuals [8].

In conclusion, recognizing and nurturing social intelligence in youth is critical to fostering a positive social environment, enhancing mental well-being, and preparing individuals for success in their future social and professional endeavors'.

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UDK 372.8

MECHANISMS FOR ENHANCING DIDACTIC PROVISION IN TRAINING STUDENTS OF HISTORY EDUCATION WITHIN A DIGITAL EDUCATIONAL ENVIRONMENT

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Abstract: The integration of digital technologies into educational settings has transformed the landscape of teaching and learning, presenting both challenges and opportunities for educators, particularly in the field of history education. This article explores mechanisms aimed at enhancing the didactic provision for training students in history education within a digital educational environment. Through a comprehensive review of relevant literature and empirical evidence, this paper discusses various strategies, including the integration of interactive digital tools, personalized learning approaches, and the development of digital literacy skills.

Keywords: History education, Digital educational environment, Interactive digital tools, Personalized learning approaches, Digital literacy skills, Virtual reality simulations, Multimedia presentations, Inquiry-based learning, Project-based learning

Аннотация: Интеграция цифровых технологий в образовательную среду изменила ландшафт преподавания и обучения, создав как проблемы, так и возможности для преподавателей, особенно в области исторического образования. В данной статье исследуются механизмы, направленные на усиление дидактического обеспечения подготовки студентов по историческому образованию в условиях цифровой образовательной среды. Посредством всестороннего обзора соответствующей литературы и эмпирических данных в этой статье обсуждаются различные стратегии, включая интеграцию интерактивных цифровых инструментов, персонализированные подходы к обучению и развитие навыков цифровой грамотности..

Ключевые слова: историческое образование, цифровая образовательная среда, интерактивные цифровые инструменты, персонализированные подходы к обучению, навыки цифровой грамотности, моделирование виртуальной реальности, мультимедийные презентации, обучение на основе запросов, обучение на основе проектов.

Annotatsiya: Raqamli texnologiyalarning ta’lim sharoitlariga integratsiyalashuvi o‘qitish va o‘qitish manzarasini o‘zgartirib yubordi, bu esa o‘qituvchilar uchun, xususan, tarix ta’limi sohasida ham muammolar va imkoniyatlarni taqdim etdi. Ushbu maqola raqamli ta'lim muhitida talabalarni tarix ta'limi bo'yicha o'qitishning didaktik ta'minotini yaxshilashga qaratilgan mexanizmlarni o'rganadi. Tegishli adabiyotlar va empirik dalillarni har tomonlama ko'rib chiqish orqali ushbu maqola turli strategiyalarni, jumladan, interaktiv raqamli vositalarni integratsiyalashuvi, shaxsiylashtirilgan ta'lim yondashuvlari va raqamli savodxonlik ko'nikmalarini rivojlantirishni muhokama qiladi.

Kalit so'zlar: Tarix ta'limi, Raqamli ta'lim muhiti, Interaktiv raqamli vositalar, Shaxsiylashtirilgan o'rganish yondashuvlari, Raqamli savodxonlik ko'nikmalari, Virtual haqiqat simulyatsiyalari, Multimedia taqdimotlari, So'rovga asoslangan o'rganish, Loyihaga asoslangan ta'lim

Introduction. In an era dominated by digital technologies, the realm of education has witnessed a profound transformation. Traditional pedagogical approaches are evolving, giving way to innovative methods that harness the power of digital tools and resources. Within the field of history education, this paradigm shift presents both challenges and opportunities. As educators strive to prepare students for the complexities of the 21st century, they must navigate the dynamic landscape of the digital educational environment.

History education plays a crucial role in shaping students' understanding of the past, informing their perspectives on the present, and empowering them to navigate the future. However, in order to effectively engage students and foster a deep appreciation for historical inquiry, educators must adapt their pedagogical practices to align with the digital age.

This article explores mechanisms for enhancing the didactic provision in training students of the educational direction of history within a digital educational environment. By delving into the integration of interactive digital tools, personalized learning approaches, and the development of digital literacy skills, this paper aims to provide insights into how educators can leverage digital technologies to create dynamic and engaging learning experiences.

The significance of digital technologies in history education cannot be overstated. With the proliferation of online archives, digital repositories, and multimedia resources, students have unprecedented access to historical information from across the globe. Interactive digital tools, such as virtual reality simulations and multimedia presentations, offer immersive learning experiences that bring history to life in ways previously unimaginable.

Moreover, personalized learning approaches empower students to take ownership of their learning journey, allowing them to explore historical topics that resonate with their interests and passions. By tailoring instruction to meet the diverse needs and preferences of individual learners, educators can foster a deeper engagement with historical content and cultivate critical thinking skills.

Central to the successful implementation of these mechanisms is the role of educators as facilitators of learning. Educators must possess the necessary skills and competencies to effectively integrate digital technologies into their teaching practices, creating meaningful learning experiences that inspire curiosity and inquiry.

Literature Review. The integration of digital technologies into education has been the subject of extensive research and scholarship in recent decades. Within the field of history education, scholars have explored the potential benefits and challenges associated with the use of digital tools and resources. This literature review aims to provide a comprehensive overview of relevant research findings and theoretical perspectives on the mechanisms for enhancing the didactic provision in training students of history within a digital educational environment.

A significant body of research has focused on the integration of interactive digital tools as a means of enhancing history education. For example, virtual reality (VR) simulations have been shown to offer immersive learning experiences that enable students to explore historical settings and events in a way that traditional textbooks cannot replicate (Dalgarno & Lee, 2010). Studies have found that students who engage with VR simulations exhibit higher levels of engagement, motivation, and retention of historical content (Baylor & Ryu, 2003).

Similarly, multimedia presentations and interactive timelines have been shown to facilitate deeper learning and understanding of historical topics (Mayer, 2005). By providing visual and auditory stimuli, multimedia resources can appeal to diverse learning styles and enhance students' ability to conceptualize complex historical concepts (Hattwig et al., 2006). Furthermore, interactive timelines allow students to interact with historical events in a nonlinear fashion, fostering a deeper appreciation for the interconnectedness of historical developments (Erickson & Nosanchuk, 2008).

Research on personalized learning approaches in history education has highlighted the importance of tailoring instruction to meet the individual needs and interests of students. For example, inquiry-based learning approaches, such as project-based learning and problem-based learning, have

been shown to promote higher-order thinking skills and historical inquiry (Levstik & Barton, 2001). By empowering students to explore historical topics that align with their personal interests and passions, educators can foster a sense of ownership and engagement in the learning process (Foster & Padgett, 2008).

Furthermore, the use of digital resources, such as online archives and primary source documents, enables students to conduct independent research and construct their own understanding of historical events (Swan et al., 2007). By providing students with opportunities to engage in authentic historical inquiry, educators can cultivate critical thinking skills and historical literacy (VanSledright, 2002).

Digital literacy skills are essential for navigating the complexities of the digital age and critically evaluating historical information. Research has shown that students often lack the necessary skills to effectively evaluate the credibility and reliability of online sources (Rosenbaum, 2017). Therefore, it is essential for educators to explicitly teach digital literacy skills within the context of history education.

By integrating activities that require students to analyze and evaluate digital sources, educators can help students develop the skills they need to discern fact from fiction and construct well-reasoned historical arguments (Berson & Berson, 2010). Furthermore, collaborative learning activities, such as online discussions and group projects, can enhance students' ability to communicate and collaborate effectively in digital environments (Dawson, 2015).

Research methodology. The effective integration of digital technologies into history education requires careful consideration of various mechanisms aimed at enhancing the didactic provision. In this section, we will explore key strategies for improving the delivery of instruction and facilitating meaningful learning experiences for students.

Interactive digital tools play a pivotal role in engaging students and enhancing their understanding of historical concepts. Educators can leverage a variety of tools, including virtual reality simulations, multimedia presentations, and interactive timelines, to create immersive learning experiences.

Virtual reality (VR) simulations allow students to explore historical settings and events in a highly interactive and engaging manner. By immersing students in virtual environments, educators can facilitate experiential learning and enable students to gain a deeper appreciation for the complexities of history. For example, students can virtually visit ancient civilizations, witness key historical events, and interact with historical figures, thereby enhancing their understanding of historical contexts.

Multimedia presentations provide opportunities for educators to incorporate visual and auditory stimuli into history lessons, making abstract concepts more tangible and accessible to students. By combining images, videos, and audio clips, educators can cater to diverse learning styles and reinforce key historical themes and concepts.

Interactive timelines enable students to explore historical events and developments in a nonlinear fashion, allowing them to make connections between different periods and understand the chronological sequence of historical events. By interacting with timelines, students can gain a more nuanced understanding of historical causality and continuity.

Personalized learning approaches empower students to take ownership of their learning and pursue their interests and passions. Educators can implement various strategies to personalize instruction and meet the diverse needs of individual students.

One approach is to provide students with choice and autonomy in selecting historical topics for research and exploration. By allowing students to choose topics that resonate with their interests, educators can increase student engagement and motivation. Additionally, educators can offer differentiated instruction to accommodate varying learning preferences and abilities, ensuring that all students have access to meaningful learning experiences.

Project-based learning (PBL) and inquiry-based learning (IBL) are effective personalized learning approaches that promote critical thinking and historical inquiry. In PBL, students work collaboratively to investigate historical questions or problems and develop solutions or presentations

based on their findings. Similarly, IBL encourages students to ask questions, conduct research, and analyze primary sources to construct their own understanding of historical events.

In the digital age, it is essential for students to develop digital literacy skills to navigate the vast amount of information available online and critically evaluate digital sources. Educators can incorporate activities and lessons focused on developing digital literacy skills within the context of history education.

One strategy is to teach students how to evaluate the credibility and reliability of online sources, distinguishing between reputable sources and unreliable sources of information. Educators can provide students with criteria for evaluating sources, such as authorship, accuracy, and bias, and guide them through the process of conducting online research responsibly.

Another strategy is to incorporate collaborative learning activities that require students to engage with digital tools and resources. For example, students can participate in online discussions, collaborate on digital projects, and share their findings using multimedia formats. By working collaboratively in digital environments, students can develop communication and collaboration skills essential for success in the digital age.

Conclusion. In the rapidly evolving landscape of education, the integration of digital technologies has emerged as a transformative force, particularly within the realm of history education. This article has explored mechanisms aimed at enhancing the didactic provision for training students in history education within a digital educational environment. Through the integration of interactive digital tools, personalized learning approaches, and the development of digital literacy skills, educators can create dynamic and engaging learning experiences that foster critical thinking, historical inquiry, and digital citizenship among students.

In conclusion, by embracing these mechanisms for enhancing the didactic provision in history education within a digital educational environment, educators can create meaningful learning experiences that prepare students to become informed and engaged citizens in an increasingly interconnected world. By fostering critical thinking, historical inquiry, and digital literacy among students, educators can empower the next generation to understand the past, navigate the present, and shape the future.

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POSSIBILITIES OF USING STUDENTS' PROFESSIONAL COMPETENCE USING SOFTWARE EDUCATIONAL TOOLS

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Annotatsiya. Mazkur maqolada talabalarning kasbiy kompetentligini dasturiy ta'lim vositalaridan foydalanish imkoniyatlari, o'quv mashg'ulotlarda dasturiy ta'lim vositalarining didaktik imkoniyatlaridan samarali foydalanish, ta'lim muassasalari korxonalarga malakali kadrlar yetkazib berishda "vertikal integratsiya"ni amalga oshirish yo'llari, ta'lim tizimida qo'llaniladigan dasturiy ta'lim vositalari turlari, ta'lim jarayonida metodik ta'minotni dasturiy ta'lim vositalari yordamida tashkil qilishga doir ma'lumotlar bayon qilinadi.

Kalit so'zlar. Dasturiy ta'lim, mashg'ulot, kasbiy kompetentlik, metodik ta'minot, didaktik imkoniyat, o'quv materiali, ta'lim sifati, integratsiya.

Abstract. In this article, the possibilities of using software educational tools to improve the professional competence of students, the effective use of didactic possibilities of software educational tools in training sessions, the ways of implementing "vertical integration" in the supply of qualified personnel to enterprises by educational institutions, the methods used in the educational system types of software training tools, information on the organization of methodical support in the educational process with the help of software training tools is described.

Key words: Software education, training, professional competence, methodological support, didactic opportunity, educational material, quality of education, integration.

Аннотация. В данной статье рассмотрены возможности использования программных образовательных средств для повышения профессиональной компетентности студентов, эффективное использование дидактических возможностей программных образовательных средств на учебных занятиях, пути реализации «вертикальной интеграции» в обеспечении предприятий квалифицированными кадрами. В образовательных учреждениях описаны методы, используемые в системе образования, виды программных средств обучения, сведения об организации методического обеспечения учебного процесса с помощью программных средств обучения.

Ключевые слова: Программное образование, обучение, профессиональная компетентность, методическое обеспечение, дидактические возможности, учебный материал, качество образования, интеграция.

Introductionю In the process of modernization of higher education in our country, special attention is paid to the supply of qualified specialists. In the Action Strategy for the further development of the Republic of Uzbekistan, "Further improvement of the continuous education system, increasing the possibilities of quality education services, continuing the quality of training of highly qualified personnel in accordance with the modern needs of the labor market" is defined as an important priority task. This requires the creation of a scientific-methodical system based on the conditions for the formation of the professional competence of students in technical higher education institutions at the level of international educational standards, as well as the research of practical methods of using software training tools in the development of functional mechanisms of independent education.

Education, especially higher education, is considered the main factor of socio-economic development. The reason for the appearance of such attention is that the highest value and main capital of society is a person, who is able to find and change new knowledge and adopt effective solutions [2].

Reforms in higher education were raised to the level of state policy, and it was recognized that the development of education determines the future development of our country. Within the framework of this policy, noteworthy activities are being carried out:

• increase in requirements for the quality of knowledge

• renewal of the function of higher education (training of a "specialist" rather than a "graduate")

• increase in the quality of the student contingent and the number of higher education institutions,

• introduction of innovative technologies, etc.

It is possible to achieve a high result or efficiency by effectively using the didactic capabilities of software tools in training sessions. The main goal of using teaching and methodical materials and electronic educational literature created on the basis of computer software tools in the effective organization of training sessions is to create a modern software training environment, to increase the quality, efficiency and effectiveness of the training process by using software training tools.

The fact that modern higher education institutions find their customers themselves and closely cooperate with them means that there is a high demand for graduates [3]. Therefore, the level of personnel, their competitiveness in the labor market is a product of the quality education process.

In this regard, in order to ensure the growth of the quality of education, it is very important to control, manage and eliminate its defects step by step. Testing the experiences of foreign countries in certain higher education institutions of our republic, and in case of positive results, their wide implementation and popularization shows its effectiveness in improving the quality of education and training competitive highly qualified personnel.

Literature review. Increase students' ability to understand the content of the educational material; explaining to students the dependence on digital technologies (autism); development of students' ability to think logically; creating motivation in the formation of professional skills; summarizing, summarizing thoughts with memory features; perseverance, aspiration and goal setting; compliance with ethical rules of interaction in imperative and manipulative communication; explaining to students the factors and consequences of ludomania symptoms; encouraging students to be patient and innovative.

B. Torayev in his researches about the methodical support of students' learning activity states the following: education is effective only when it is built as a methodical system. The specific features of the modern methodical system of education are shown in the following [9].

In the dissertation of A.R. Jorayev on the topic "Improving the methodology of formation of professional competencies of future teachers based on programmed educational tools" in the process of preparing students for professional activities based on the competency approach, didactic possibilities of forming general technical skills in the qualification requirements by using programmed educational tools were developed. developed [5].

In his research, A.A. Verbisky emphasizes that the main social, personal values and principles of the human soul, all mental processes of the soul are considered as an integral unit of the body, and the correct formation of these units serves as an important tool in the implementation of the goals of the human being with the help of established psychological programs [1].

S.Kh.Aliboyev's thesis entitled "Improving the Methodology of Creating and Using Interactive Electronic Training Simulators" in the process of training specialist personnel in higher education institutions, the wide application of interactive software tools, digital technologies, forms of distance education, open educational resources, mixed the use of electronic educational resources in the development of educational (online,/offline) technologies is considered as an urgent problem.

Analysis. Today, employers in the labor market pay attention not only to the professional knowledge and skills of specialists, but also to the presence of the following personal qualities:

• independent critical thinking, the ability to see emerging problems, the ability to find ways to rationally solve them using modern technology;

• ability to think independently and solve various problems;

• acquired critical and creative thinking;

• ability to flexibly adapt to changing life situations while independently acquiring the necessary knowledge;
• the ability to apply knowledge in practice to solve problems;
• clearly imagines the possibilities of how to apply existing knowledge;
• the ability to generate new ideas;
• the presence of a rich vocabulary based on a deep understanding of humanitarian knowledge;
• competence in working with information; communication (communicability).

Undoubtedly, any model that is being designed must be related to the professional activity of future specialists, which is the main link of the system of personnel training with competitive high competence.

If we take into account that informatization of society is one of the global problems, in comparison with other trends of modern society development, informatization comes to the fore [7].

Today, the sharp increase in the introduction of new modern software educational tools and information technologies divides the new information environment for human life, that is, software educational tools into several groups.

Educational institutions remain constant partners in the supply of qualified personnel to enterprises. Such cooperation is usually called "vertical integration" between industry and higher education.

In this integration, the following can be done in the process:

1. In the process of joint action, equal participation of both parties is ensured; Heads of enterprises are involved in the board of trustees of HEI (Higher Educational Institution); It is ensured that organizations participate in scientific research works and projects, as well as in the formation of entry quotas of HEIs [8].

2. Production practices are organized based on the establishment of department branches in enterprises, and mature specialists are involved in this process.

3. The enterprise participates in the improvement and development of the material and technical base of the Higher Education Institution, in the updating of laboratory equipment, and in the retraining of personnel.

4. HEI studies existing scientific problems in the enterprise and participates in solving them with its suggestions.

Such integration requires a comprehensive approach and ensures the development of both sides. That is why innovative corporate cooperation with production enterprises is considered one of the main issues in the next years.

A professionally oriented model of training based on cooperation between a higher education institution and production enterprises creates a wide range of opportunities for students:

- the demand for graduates of these higher education institutions will increase in the labor market due to the increased level of competence of future specialists;
- ensures the direct participation of professors and academic staff in the production process;
- students prepare themselves for jobs in advance, they are distinguished by their highly developed skills and qualifications;
- exchange of scientific and practical experience between higher educational institutions and enterprises;
- it is possible to develop a system of additional incentives for students based on the implemented project, innovative activities and business contracts.

The formation of the labor market in the conditions of market relations requires the training of highly competitive specialists with a deep understanding of their field and a high level of professional competence. Because every enterprise must occupy its economic position, be ready to overcome competition, and ensure its continuous development. The enterprise should constantly strive to expand the scope of production, increase its share in the market, cover new areas. So, the company has its own interests in the formation of specialists with a high level of competence.

Discussion. The process of modernization of education has brought us learning through multimedia scenarios, educational video and audio materials, 3D software, virtual museums, libraries

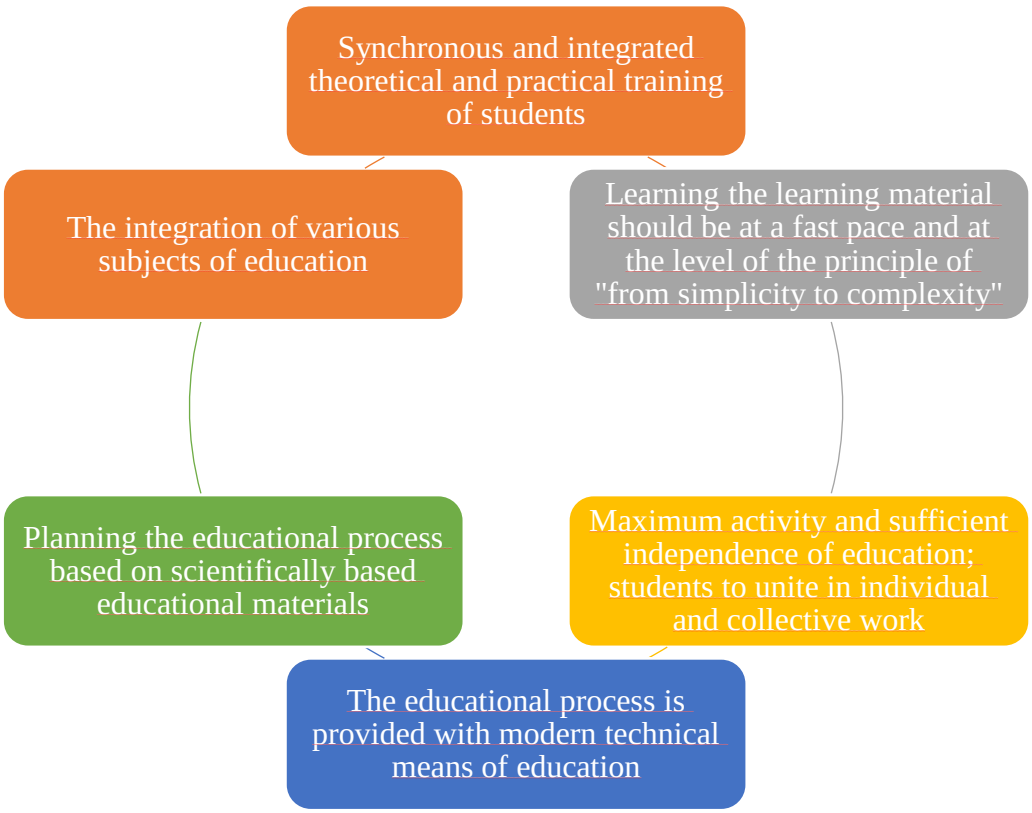
and laboratories. They allow everyone to access educational materials, video tutorials, as well as participate in video tournaments, use electronic libraries and keep electronic diaries.

Along with free access to the content of higher education, software educational tools create wide opportunities for shaping the educational process, taking into account the professional abilities of each learner. Also, textbooks are digitized at the request of users, and distance courses are being organized based on them [10].

Software is divided into two types, i.e., systematic and practical software, and in this work mainly programs used in the educational process (creators of electronic textbooks and manuals, mobile programs) and educational management systems from software systems such as LMS (Learning Management Systems), CMS (Content Management Systems) improvement of users' knowledge, skills, and abilities was studied.

If we look at methodical support in the educational process as a theoretical concept built in a certain conditional sequence, the factors that need to be supplemented from the point of view of digital education can be enriched with the concepts of a skilled pedagogue and modern educational content [6].

However, it is worth highlighting the impact of ICTs used in the education system on the effectiveness of the teaching process. Efficiency and productivity are one of the universal criteria for evaluating the successful operation of any social system. The universal criterion for evaluating effectiveness in education is the satisfaction of all organizations with the work of members of this institution.



Currently, the higher education system cannot provide sufficient breadth and depth of fundamental knowledge. The problem is that the future specialist must have the skills and professional mobility to quickly respond to changes that occur constantly in practical and scientific activities, in general social life [4]. This result can be achieved if higher education can provide a graduate with a common unified methodology of professional activity.

Based on digital analysis in the field of ICT, we see that demand and supply will be presented to users through a clear and understandable database, the formation of a digital education market in the field of programming, and development trends will be realized without human participation. Clearly, we can see mobile learning in a broad sense leading to educational independence for learners.

Conclusion. Legal and ethical concepts are also the main factor of great importance in the organization of activities with software educational tools. Implementation of concepts in this regard at the lower stages of education, that is, joining various target groups in social networks, serves to prevent vices such as network criminals. In order to prevent the development of the above negative problems, digital educational materials should be up to date and, most importantly, satisfy the student's interest in science.

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THE PHENOMENON OF GRADUONYMY

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Annotatsiya. Ushbu maqola o‘zbek va ingliz tilshunosligining grammatik sohalaridan biri bo’lmish graduonimiyani tadqiq qiladi. Bundan tashqari, bu maqolada graduonimiya hodisasi taqqoslanadi va turli tillardagi misollar keltiriladi. Bu maqolaning asosiy e’tibor qaratilgan jihati o‘zbek tilshunosligida graduonimiyaning ilmiy tadqiqi va uning turli darajalarda namoyon bo‘lishidir

Tayanch so‘zlar: graduonimiya, graduonimiya hodisasi, zamon, tovush, harakat, tasdiq va inkor shakllari fe’l, grammatik soha, vazifaviy shakl, leksik soha.

Аннотация: В данной статье изучается градуонимия, одна из грамматических областей узбекского и английского языкознания. Кроме того, в данной статье сравнивается явление градуонимии и приводятся примеры из разных языков. Основным аспектом данной статьи является научное исследование градуонимии в узбек34ском языкознании и ее проявления на разных уровнях.

Ключевые слова: градуонимия, явление градуонимии, время, звук, действие, утвердительная и отрицательная формы глагола, грамматическое поле, функциональная форма, лексическое поле.

Abstract. The grammatical fields of Uzbek and English linguistics explore and demonstrate graduonymy in this article. Additionally, the graduonymy phenomenon is compared, and instances in various languages are provided. The scientific study of graduonymy in Uzbek linguistics and the various levels at which it manifests itself are the subjects of this article.

Keywords: graduonymy, phenemenon of graduonymy, tense, voice, action, affirmative and negative forms verb, grammatical field, functional form, lexical field.

Introduction. Graduonymy is a phenomenon that linguistics believes primarily manifests at the lexical level. The phrase was first applied to word semantic interactions in Uzbek linguistics. Graduonymy is a phenomena that is characterized by a change in word meaning at various word levels. The phenomena of grading has been the subject of several linguistics investigations. We will also discuss ranking in lexemes that denote action (verbs) in this paper, with an emphasis on previous research on the subject. As a scientific theory, ranking was mentioned in the 1990 dissertation "Hyponymy in the Uzbek language" by scientist R. Safarova.[1]

Literature Review. Graduonymy is a phenomenon that is sometimes cited as occurring at the lexical level in world linguistics. In the phonological system, gradual relationships are investigated in some detail. The range of lexical-semantic interactions was mostly restricted to synonymy, antonymy, polysemy, and monosemy up until the 1960s. Later, these connections were transferred from lexicon to syntax and morphology. In addition, partonymy (holo-meronymy), hyponymy, cogyponymy, and plesionymy (species reported in J. Lyons and L.R. Horn's publications) were included to this series.

The concept of grading is thoroughly studied by Sh. Orifjonova in her research "Lexical graduonymy in the Uzbek language". The primary research issue in the scientist's work is graduonymy. Graduonomic relations are the focus of the investigation. In his doctoral dissertation "Graduation in the Uzbek language" published in 1997, O. Bozorov examined syntax and stylistics in addition to teaching graduonymy in the system of verbal relations. Our goal in this work is to shed light on the phenomena of action lexeme graduonymy in grammatical categories. [2]

According to O. Bozorov's research, "Ranking is inherent in the semantic structure of lexemes and phrases, in which independent semantics contain general semantics that reflect the minority or majority of a sign." The scientist asserts that syntactic, morphological, and semantic properties are frequently used to classify word groupings. Consequently, it is possible to examine word grouping locations graduonymy in relation to one another using each of the three previously mentioned criteria.

In his research, Professor O. Bozorov finds that verbs exhibit graduonymy in both the wide and specific sense of meaning (sent (one person) -movement (people). Additionally, it is assumed that the meaning of the affirmative and negative forms of the verbs (read, may read, seem to read, not read, not read at all) differs in significance from one another (o‘qigan, o‘qigan bo‘lsa kerak, o‘qigandir, o‘qigan ko‘rinadi, o‘qigan emas, o‘qigani yo‘q aslo)). Given some situations, we are unable to locate equivalents in English. Thus, this characteristic can be considered innate to the Uzbek language. Writer.) Furthermore, he examined the phenomena of graduonymy in verbs, categorizing them into two types: partial transitions, where the action changes from the verb to the object (e.g., "eat from the bread, drink from the water"), and complete transitions, when the action changes from the verb to the object (e.g., "eat bread, drink aqueous). Furthermore, he thought that there are three stages to the phenomena of transition: the first relationship (see the bread and help yourself!); the partial transition (bite from the bread); and the full transition (consume the bread). This article compares and analyzes various grammatical categories of action lexemes, or verbs, with English in order to examine graduonymy in those areas. [3]

We believe that lexemes that denote action verbs should be the focus of our study since they exhibit the phenomenon of graduonymy. O. Bozorov initially groups verbs in his scientific work based on the spiritual content of the verbs. In other words, when the movement's sign diminishes:

Verb -------- Functional form ----------connective
Verb --------- Functional form ----------Auxiliary
Verb ------ Gerund Noun
Verb ------ Participle ----------Adjective
Verb ------ Participle ----------Adverb
Verb ---------- Functional form ----------Particle
Verb -------- Functional form ---------- Exclamation.

Above an example, graduonymic rows are provided. As an example of an exact verb, let's take the graduonomic rows indicated before and place it in the graduonymic rows. We create a graduonymic row as an example of lexemes that have the same fundamental meaning when a verb's grammatical category, functional forms, or word groupings are covered by it. As an illustration, consider the verb "to work": worked, am/is/are working, have/has worked (verb) -working (gerund) -work (noun). Evidently, graduonymy between verbs in functional forms and nouns that comprise single-stem words has not been seen. Graduonymy may suggest a reduction in the sign of the action based on the spiritual content of the verbs, however graduonymy can also
effectively conveyed by correctly expressing the phenomenon of gradation through the verbs' semantic lexemes. Say, "Call, shout, scream."

Research Methodology. Additionally, if we look at the verb-participle-adjective graduonymic row, we will see an example of a lexeme that indicates an action based on a single stem: Sarq (yellow) (adjective) - Sarg'aygan (turned yellow) (past participle) - Sarg'aymoq (turn yellow) (verb). Verb - participle - adjective There is no way in the world that the words in the example based on adjectives exhibit graduonymy.

The graduonymy phenomena in English can be observed in the following ways: verb - gerund - noun; verb - present participle - adjective; verb - past participle - adverb. Let's look at verb-gerund-noun in the graduonymy row using the following verb examples: propose, suggest, and suggest. As can be seen, this row does not exhibit the phenomenon of graduonymy. Furthermore, it cannot be claimed that these English rows exhibit graduonymy: verb: functional form - imperative; verb: particle; verb: functional form - conjunction; verb: finite form - imperative.[4]

According to O. Bozorov's research, there is graduonymy in the Uzbek language's mood categories of goal, command, desire, and notice. This is because he illustrates the graduonymy based on the likelihood that the action's content would be represented in the verb and become a reality (event). However, he also thinks that there is a hierarchy of want, ranging from the first person to the order (third person), even in the forms of command or desire inclination. For instance, bor / borgin (Go!) (II person) - borsin (- Let him / her go) (III person) - boray (let me go) (I person).

Analysis And Results. However, there is just one imperative mood in English, which is

utilized to convey meaning for orders, wishes, requests, counsel, and direction. As a result, mood meanings in English cannot be ranked the same way they are in Uzbek. The hierarchies of the command-desire in the I, II, and III person forms of the Uzbek language can be stated in English as follows:

Boray - Bor / Borgin - Borsin

Let me go - Go - Let him / her go.

Do! Go! Read! is the first verb in a phrase in the imperative mood in English, and it is generally addressed to the second person. The verb let and the personal pronoun in the object case are employed in the I and III person forms:

Let me + verb (I person singular)

Let us (Let's) + verb (I person plural)

Let him / her / it + verb (third person singular) Let them + verb (III person plural).

It is a bit more difficult for people to understand the meanings from desire to command through examples in Uzbek (boray - bor / borgin - borsin) and English (Let me go - Go - Let him / her go) "Ranking can also be seen in verb categories and functional forms," claims O. Bozorov. Verbs have relationships between their affirmative and negative forms, and rows of graduonymy can be constructed using the precise forms that correspond to intermediate meanings. Suffixes with a declining state of meaning assist build rows of graduonymy between the read and unread words placed in the binary opposition: read - must have read - not seen to read - not read - not read - not read at all. Naturally, there are spiritual downsizings along this path from carrying out an action to not carrying it out. As modal meanings increase, a row of graduonymy is produced based on a core. It was not possible to substitute any verb for any component of this row that would communicate the same meaning. Giving precisely the identical instances for every member of the aforementioned graduonymic series is not possible since in Uzbek, suffixes are the sole way to communicate modality meanings.

The following instances will be examined if we place the affirmative and negative forms of the verb in English in binary opposition. The English Present Perfect tense is used for the examples. The modal meanings between the phrases "have read" and "has read" can be determined by using modal verbs in conjunction with certain verbs, such as "read," "must have read," "read," "does not appear," "seems not to read," "not read," and "not read at all." English equivalents for every member of the ranking series can be found. Have read or has read; may or might not have read; have not appeared to have read; appear to have not read; have not appeared to have read (looks unread); have not appeared to have read / has never read (also not read)-has not read (have not read). Individuals who are ranked as not reading or never reading, for instance, have not read in English. Additionally, Bozorov O. discussed the existence of grading in tenses in his doctoral dissertation, "Leveling in the Uzbek language". We take a look at the study's rating of the time category below: It is obvious that the present tense is the intermediate third of the three main categories of particular meanings for time, which are the original past, present, and future. Additionally, the present-future tense form of this graduonymy connects the present and future forms.

Conclusion. As we've demonstrated, graduonymy in lexemes (verbs) that reflect actions can also arise when the action, state, degree of meaning increase or reduction, suffixes, relative or tense additions, and modality are not present. O. Bozorov's study "Leveling in the Uzbek language" states that in Uzbek linguistics, grammatical categories and verb functional forms themselves exhibit graduonymy. We have created a row of graduonymy in Uzbek by examining the current rankings in the verb grammatical categories. Graduonymy is a phenomena that occurs in various English grammar categories and verb functional forms. Graduonymy is a phenomena that is more obvious in lexemes with independent meanings than it is in verb functional forms and grammatical categories.

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BASIS OF CHINESE PHONETIC SYSTEM – SUPERSEGMENT ELEMENTS

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Annotatsiya. Mazkur maqolada biz xitoy tilining fonetika tizimi segment va supersegment (prosodik) elementlaridan tashkil topishi va supersegment (prosodik) elementlari o’z navbatida **ton, ohang** va **urg’u** kabi fonetik vositalaridan iborat ekanligini batafsil ko’rib chiqamiz.

Kalit so’zlar: segment elementlar, supersegment elementlar, ton, ohang, urg’u, kuchli urg’u tushgan bo’g’in, kuchsiz urg’u tushgan bo’g’in, urg’usiz bo’g’in

Аннотация. В данной статье мы подробно рассмотрим, что фонетическая система китайского языка состоит из сегментных и суперсегментных (просодических) элементов, а суперсегментные (просодические) элементы, в свою очередь, состоят из таких фонетических средств, как тон, интонация и ударение.

Ключевые слова: сегментные элементы, суперсегментные элементы, тон, интонация, ударение, сильноударный слог, слабоударный слог, безударный слог

Abstract. In this article, we will consider in detail that the phonetic system of the Chinese language consists of segment and supersegment (prosodic) elements, and supersegment (prosodic) elements, in turn, consist of phonetic tools such as tone, intonation and accent.

Keywords: segmental elements, supersegmental elements, tone, intonation, accent, strongly accent syllable, weakly accent syllable, unaccented syllable

Introduction. Language is the mirror of every nation, its true reflection. As long as there is a language, the nation is alive. A person understands the world through language, learns its history, realizes his identity, and becomes enlightened.

If a person learns another foreign language in addition to his native language, he will have a broad outlook and deep thoughts. Therefore, everyone should study other foreign languages in addition to their native language. It is even better if a person starting to study a foreign language first carefully studies the grammar of his native language, and then begins to study another foreign language.

In this article, we will discuss in detail the phonetic system of the Chinese language. The phonetic system of the Chinese language consists of segment and supersegment (prosodic) elements. Supersegmental (prosodic) elements, in turn, consist of phonetic means such as tone, intonation and accent.

All three tools listed above are definitely used in one or another case. The main purpose of using phonetic tools in the process of speaking is to distinguish the same words from each other, to focus on one word in a sentence.

Research methodology. When writing this article, we mainly used the following research methodology: the method of linguistic description (to analyze and describe the phonological variants of words in modern Uzbek and Chinese languages).

Literature review. In turn, the following scientists studied the phonetic system of the Chinese language: 邵敬敏.《现代汉语》, 黄伯荣,廖序东.《现代汉语》, Speshnev N.A.

"Phonetics of the Chinese language", Zadoenko T. P. "Fundamentals of the Chinese language. Introductory course."

Main part. In Chinese, tone (intonation) is used mainly depending on the tone of the sentence, with the help of certain punctuation marks. In addition, tone (intonation) consists of a complex of certain prosodic elements, which consist of melody, tempo, rhythm, force, timbre and logical accents.

From them, logical emphasis analyzes different sentences in terms of syntactic meaning and categories. The quality of the tone can be determined based on certain acoustic parameters, i.e. volume, longness and shortness, and on the other hand, based on supersegmental elements.

When we say that a word has a certain tone, it is more commonly referred to as a change in the pitch of the pronunciation when spoken. Such a change is called musicality in science.

It is known that in Chinese, tone helps to distinguish words from each other in pronunciation. If the words are pronounced correctly and clearly in their own tone while speaking, neither the musicality nor the structure and meaning of the words will be harmed in any way. There are some auxiliary words in the Chinese language that need to be distinguished and pronounced correctly only depending on the meaning of the sentence. For example, the auxiliary word "a" will have the desired meaning only if it is pronounced correctly after the following words:

咋们走吧 → zánmẻnzǒubå → let's go (it's time, we have to go);

咋们走吗 → zánmẻnzǒumå → are we gone (are we going or not);

咋们走哇 → zánmẻnzǒuwå → let's go! (we don't expect them).

All of the above words mean "let's go", but the auxiliary word has different meanings depending on how it is pronounced. Our next concept is a part of intonation - rhythm. Rhythm includes acceleration and deceleration, length and brevity, increasing and decreasing during speech. The concept of rhythm is closely related to tempo, rhythmic and logical (spiritual) emphasis, emotional (feeling) vocals, total length of a sentence, and semantic expression. In Chinese, each sentence is divided into several rhythmic groups, in which several weakly or strongly stressed words are grouped around a single strongly stressed word. This strongly stressed word is a rhythmic word. Now let's talk about the pause, which is closely related to the concept of rhythm. When pronouncing a sentence in Chinese, it is very important to pronounce it with pauses (pause). Pronunciation with a pause does not mean the end of a syllable, word or sentence. Pronunciation with pauses in the process of pronunciation in Chinese is divided into two types, these are:

- Grammatical pause;
- Logical (meaning) pause.

According to its duration, the pause is further divided into short and long pauses. Grammatical long pauses can be found after full stops, exclamation marks and question marks at the end of sentences. A shorter pause can be found when semicolons, commas and semicolons appear. A pause that stands out from the above is mainly seen in colons, multiple dots and dashes, because in them the pause is very different from the others. In addition, there are also logical pauses, which are used when pronouncing a word in a sentence as the word with the most basic meaning. For example:

对我来说时间是第一个可宝贵的→duì wǒ lái shuō shíjiān shì dì yī gẻ kě bǎoguì dẻ → For me, the most valuable thing in life is time.

The pace of speaking in Chinese often depends on the genre of the text. It is clear how to read the texts of poems, essays, and prose, that is, it can be read faster. Poems can also be read more slowly when being recited. The essay should be read more slowly than the article, because the author uses more emotional words in the introduction. If we look at it from the semantic point of view, it is better to read exciting, passionate, joyful texts faster during the conversation. It is appropriate to pronounce the texts that come with a quiet, solemn, angry mood more slowly. In direct speech, dialogues, celebratory speeches or boring speeches are pronounced slowly, and lively conversations and discussions are pronounced quickly.

Chinese words can be used in different tones when speaking. For example, by putting an exclamation mark at the end of a sentence when speaking with excitement:

祝您健康! Zhù nín jiànkāng! I wish you health!

他真是个忸忸怩怩的人啊！Tā zhēn shì gè niǔniǔníní de reń a! He is a very shy person!

In the first sentence mentioned above, he wishes health to his loved one full of emotion, and in the second sentence, exclamation marks are used because he is talking about a person's shyness and shyness.

哪个男孩是你最好的朋友？Nă gè nánhái shì nǐ zuì hăo de péngyou? Which boy is your best friend?

这是什么，你能告诉我吗？Zhè shì shénme, nǐ huì gàosu wǒ ma? Can you tell me what it is?

In the first quoted sentence, exactly which guy is he, and in the second sentence, what kind of thing is he asking a question using a question mark.

书上没说他是在哪里出生的。Shū shàng méi shuō tā shì zaì nă lĭ chūshēng de. The book does not say where he was born.

学校是一些儿童很讨厌的地方。Xuéxiào shì yìxiē értóng hěn tăoyàn de dìfang. Some children do not like school.

In the above two sentences, information about a certain situation is given without any emotions, and therefore it appears as an indicative sentence.

So, we looked at the sentences that came in three different tones, all three of them in the process of pronunciation have a specific melody (melodic rise and fall), tempo (fast, medium or slow), rhythm (long in the pronunciation of words and sequence of brevity, high and low, slow and fast), strength (strong, medium or weak), timbre (high, medium or low timbre) and logical accents focused on a particular word is pronounced. Without the above complexes, the sentence is pronounced without any emotion, without meaning, without expression.

The second phonetic tool, accent, also exists in Chinese. Accents are used in different ways in different languages. For example, in Uzbek the accent is often on the last syllable, in Russian it is on various syllables, in Czech it is mostly on the first syllable, and in Polish it is on the syllable before the last one. we can observe the fall.

The accent also differs from one another depending on how it is pronounced at different heights and lengths in different languages. For example, in Japanese, a accented syllable is pronounced in a high melodic and longer position; in German, the accented syllable is pronounced high and strong, including in French.

And the Chinese language skillfully uses natural tonal (musical) speech and accents. In Chinese, the accent is mainly pronounced at three different aria levels, which are:

1) a strongly accented syllable - it is pronounced longer and the tonal syllable is clearly heard;

2) a weakly accented syllable - it is pronounced relatively shorter, the pronunciation of the tone can be heard even if it is lower;

3) unaccented syllable - pronounced short and flat.

Usually, the unaccented and unaccented syllable is pronounced very short, and sometimes it is completely erized.

In addition, the accent is again divided into two, i.e. rhythmic and logical accent. The rhythmic accent mainly falls on one central word in the sentence, and the rest of the secondary words come around it:

我看报 → wǒ kàn bào → "I am reading a newspaper";

我看今天的报→ wǒ kànjīntiåndě bào → "I am reading today's newspaper".

Logical emphasis falls mainly on the word that has the main meaning in the sentence, therefore, logical emphasis is not always the same. Since the logical accent is not similar to the rhythmic and syntagmatic accents, it should be carefully distinguished from other accents. Logical emphasis can fall on any word or phrase in a sentence, here are a few examples:

我不会写诗,你来写→ wǒ bú huì xiě shī, nǐ lái xiě → "I don't know how to write poetry, you write";

谁说我会写诗,我不会写诗→shuí shuō wǒ huì xiě shī,wǒ bú huì xiě shī→ "who said that I can write poetry, I can't".

Many scientists working in the field of phonetics of the Chinese language have proven that in Chinese words, sometimes one and sometimes two syllables can be accented. The Chinese language differs from other languages in that not only one, but also two syllables are accented in one word.

Among the supersegment elements, the most important tool in Chinese is tone.

When we pronounce words, we do not pronounce them uniformly, but in a certain melodic state. In the Uzbek language, such tools include accent and tone, while in Chinese, tone is also an important part of them. It is impossible to imagine the Chinese language without tones, just as it is impossible to imagine our language without words and sounds. Because almost all words in Chinese are pronounced with tones. If a word is mispronounced or mispronounced, the word may lose its meaning or be misunderstood.

In the phonetic system of the Chinese language, there are 5 types of tones:

- the first tone;
- second tone;
- third tone;
- the fourth tone.

So, in the Chinese language, the tone phonetic tool performs the function of meaning differentiation, and if one syllable is pronounced in 4 different tones, 4 words with different meanings are formed.

For example:

1) bā - 八 - eight;
2) bá - 拔 - to pull;
3) bǎ - 把 - bunch;
4) bà - 爸 - father.

Conclusion and recommendations. So, tone (intonation), accent and tone are considered to be the main phonetic tools in the phonetic system of the Chinese language. With their help, it is possible to easily distinguish many words that are written and read in the same way in the Chinese language, in addition, it is possible to easily determine which is the main central word in the sentence with the help of these tools.

If students and people of any age learning Chinese in general study the above-mentioned supersegmental elements well, when speaking Chinese, which word, phrase, sentence, text after listening carefully to all of them, paying attention to their tones, accents, and tones, they will be able to easily understand their meanings clearly.

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THEORY OF MOTION ANALYSIS OF WOOL FIBERS UNDER THE ACTION OF PINCHING ROLLERS.

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Annotasiya: ushbu maqolada uy va yaylov sharoitida boqilgan, qorako‘l va jaydari zotli qo‘y junlarini valikli chimdib tozalash mashinasida diametri qarab guruhlarga ajratish nazariy jihatdan o‘rganilgan.

Kalit so‘zlari: jun tolasi diametri, tola uzunligi, aylanish tezligi, ishqalanish kuchi, markazdan qochma kuch, xavoning qarshilik kuchi

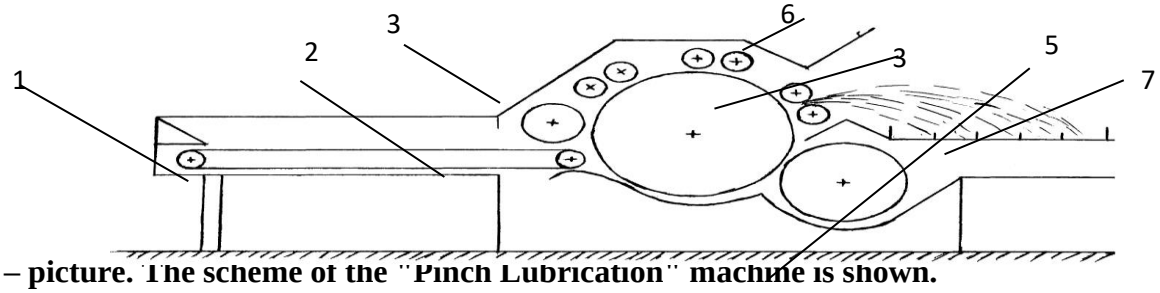
Аннотация: в данной статье приведены результаты исследований по сортировке шерсти домашних и пастбищных овец, а также овец местных пород на группы в зависимости от диаметра волокон на валичных разрыхлительных машинах.

Ключевые слова: диаметр шерстяного волокна, длина волокна, скорость вращения, сила трения, центробежная сила, сопротивления воздуха

Abstract: this article presents the results of research on sorting the wool of domestic and pasture sheep, as well as sheep of local breeds into groups depending on the diameter of the fibers on roller opening machines

Key words: wool fiber diameter, fiber length, rotation speed, friction force, centrifugal force, air resistance

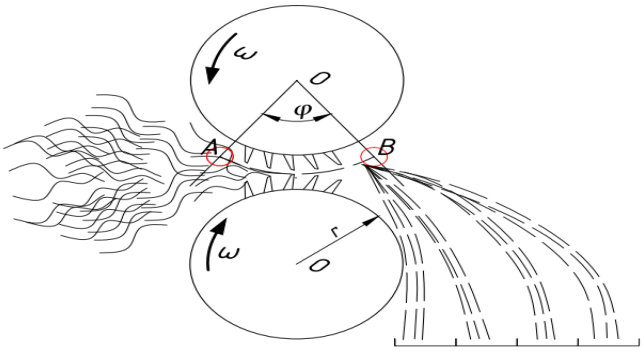
Introduction. The theoretical analyzes of wool fiber separation under the effect of a pinching roller are presented. The issue of correct selection of transmission distances depending on the length and mass of wool fibers under the influence of wool fiber pinching rollers is presented. According to the theory, the role of air in separating the wool fibers along the surface under the influence of the pinching rollers is considered to be important, that is, separation of separated wool fibers under the influence of pinching rollers under the influence of air is aimed at preventing the separation of separated wool fibers into the stream and thereby increasing the efficiency of cleaning.



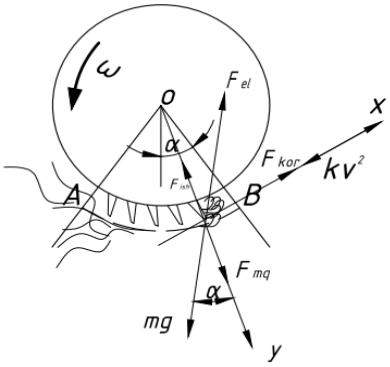
1 – picture. The scheme of the "Pinch Lubrication" machine is shown.

in this case: 1- supply tape, 2- fiber straightening cylinder, 3- pinching rollers, 4- main drum, 5- separation drum, 6- cover, 7- test area.

When sorting wool fibers mainly according to their diameters and masses, wool fibers are sorted into the following wool fibers: 1-fine fiber wool, 2-medium wool, 3-half-coarse wool, 4-coarse wool, the lengths of these wools are in the range of 50-100 mm.



2-picture. Scheme of the effect of the pinchingroller on wool fibe



3-picture. Scheme of the forces affecting the separation of wool fibers

$F_{m.q}$ - centrifugal force, $k \cdot \vartheta^2$ - air resistance, mg-weight, F_{ish} - friction force. $F_{m.q} = m \cdot \omega^2 \cdot l$; $F_{ish} = f \cdot N = f \cdot m \cdot g$; ω - angular speed of the pinching roller; l - pile length; m- mass of wool fibers, $F_{кор} = 2 \cdot m \cdot \omega \cdot \dot{x}$ - cariolis force, f - coefficient of friction (between wool fibers and pile surface).

From the above given figure-3, φ the angle of coverage of the pile acting along the arc $\breve{AB}$ and we will consider the theory of the transmission of pinching rollers as a result of friction between fibers when separating wool fibers, firstly, we present the differential equation along the OX arc under the influence of a roller that cuts wool fibers. [1]

$$m \cdot \ddot{x} = F_{kor} - m \cdot g \cdot \sin\alpha + k \cdot \vartheta^2$$

$$m \cdot \ddot{x} - 2 \cdot m \cdot \omega \cdot \dot{x} = k \cdot \vartheta^2 - m \cdot g \cdot \sin\alpha$$

$$\ddot{x} + 2 \cdot \omega \cdot \dot{x} = \frac{k}{m} \cdot \vartheta^2 - g \cdot \sin\alpha \quad (1)$$

(1) We determine the homogeneous and particular solutions of the second-order homogeneous differential equation.

We look for a homogeneous part in appearance. $\dot{x}_1 = \lambda e^{\lambda t}, \ddot{x}_1 = \lambda^2 \cdot e^{\lambda t}$ we insert this expression into equation (1). $\lambda^2 + 2 \cdot \omega \cdot \lambda = 0$ $\lambda_1 = 0$; $\lambda_2 = -2 \cdot \omega$;

$$x_1 = c_1 \cdot e^{\lambda_1 t} + c_2 \cdot e^{\lambda_2 t}$$

$$x_1 = c_1 + c_2 \cdot e^{-2 \cdot \omega \cdot t} \quad (2)$$

Identical solution

we put the determined figures into equation (2). $\alpha = \omega \cdot t$

$$-A \cdot \omega^2 \cdot \cos\omega \cdot t - B \cdot \omega^2 \cdot \sin\omega \cdot t - 2 \cdot A \cdot \omega^2 \cdot \sin\omega \cdot t + 2 \cdot B \cdot \omega^2 \cdot \cos\omega \cdot t = -g \cdot \sin\alpha \quad (4)$$

(4)we determine immutable A and B figures by equalizing $\sin\omega \cdot t$ and $\cos\omega \cdot t$ coefficients.[2]

$$\begin{cases} -A \cdot \omega^2 + 2 \cdot B \cdot \omega^2 = 0 \\ -A \cdot \omega^2 - 2 \cdot B \cdot \omega^2 = -g \end{cases}$$

$$A = \frac{g}{2 \cdot \omega^2}; \quad B = \frac{g}{4 \cdot \omega^2};$$

We put these outcomes into equation (3).

$$x_2 = \frac{g}{2\cdot\omega^2}\cdot\cos(\omega\cdot t)+\frac{g}{4\cdot\omega^2}\cdot\sin(\omega\cdot t) \qquad (5)$$

The general solution of the movement of wool fibers along the OX axis under the influence of a pinching roller is expressed as follows.

$$x = x_1+x_2 = c_1+c_2\cdot e^{-2\cdot\omega\cdot t}+\frac{g}{2\cdot\omega^2}\cdot\cos(\omega\cdot t)+\frac{g}{4\cdot\omega^2}\cdot\sin(\omega\cdot t)+\frac{k}{m}\cdot\vartheta^2 \qquad (6)$$

From the expression (6), we use the initial and boundary conditions to determine the constants C1 and C2.

$(x)_{t=0}=0$; $(\dot{x})_{t=0}=0$; is used.[3]

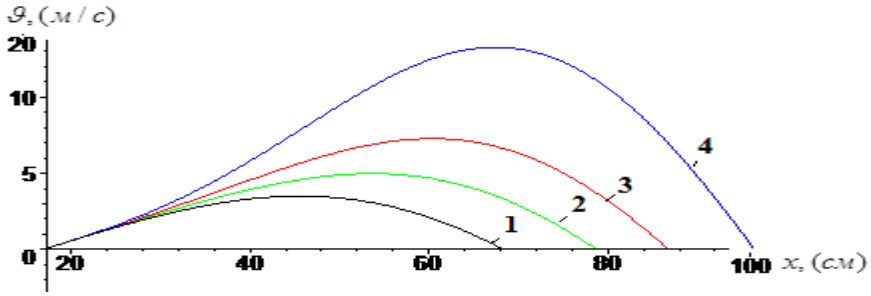
$$\begin{cases} C_1+C_2+\dfrac{g}{5\cdot\cdot\omega^2}+\dfrac{k\cdot\vartheta^2}{m}=0 \\ -2\cdot\omega\cdot C_2+\dfrac{g}{4\cdot\omega}=0 \end{cases}$$

$$C_2=\frac{g}{8\cdot\omega^2};\ C_1=-\frac{5\cdot g}{8\cdot\omega^2}-\frac{k\cdot\vartheta^2}{m}$$

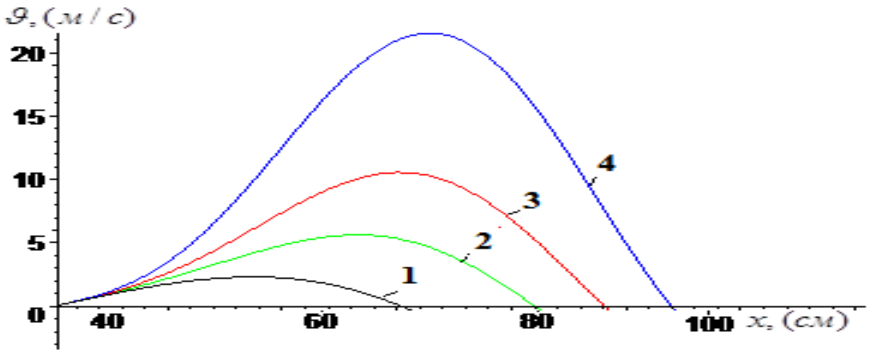
We put the determined C1 and C2 results into equation (6).

$$x = x_1+x_2 = -\left(\frac{5\cdot g}{8\cdot\omega^2}+\frac{k\cdot\vartheta^2}{m}\right)+\frac{g}{8\cdot\omega^2}\cdot e^{-2\cdot\omega\cdot t}+\frac{g}{2\cdot\omega^2}\cdot\cos(\omega\cdot t)+\frac{g}{4\cdot\omega^2}\cdot\sin(\omega\cdot t) \qquad (7)$$

From the equation (7), the dependence of wool fibers on the mass of wool fibers and the angular velocity of the pinching roller during the separation of wool fibers under the influence of the pinching roller was analyzed in graphics using the Maple program. The following parameters are included in the calculation: $g=9{,}81\,м/с^2$; l=1,8mm; $\varphi=80^0$; $\omega=35c^{-1}$; m_1=0,023mlgr; m_2=0,023mlgr; m_3=0,014mlgr; $d_1=40\,mkm$; $d_2=35\,mkm$; $d_3=30\,mkm$; $d_4=25\,mkm$; ρ_{wool}=1.,28÷1,32gr/sm^3.



4-picture. The graph of transmission distances of masses of wool fibers separated under the effect of pinching roller in different m_1=0,023mlgr; m_2=0,023mlgr; m_3=0,014mlgr; ; m_3=0,008mlgr **figures.**



5-picture. Graph of distance transmission of wool fiber diametres separated under the effect of pinching roller in $d_1=40\,mkm$; $d_2=35\,mkm$; $d_3=30\,mkm$; $d_4=25\,mkm$; **figures.**

Conclusion: From the analysis of the above graphs, the movement along the OX axis under the influence of the pinching roller during the separation of wool fibers is given. In this case, the problem of sorting the separated wool fibers according to the fall distances under the influence of external forces acting on the wool fibers, the flight distances are given from the equation of dependence on the masses and diameters of the wool fibers.

It should be noted from the graphs that the transmission and sorting trajectories of wool fibers at different values of masses and diameters of their velocities are presented. Values of different masses of wool fibers m_1=0,023mlgr**;** m_2=0,023mlgr**;** m_3=0,014mlgr**; ;** m_3=0,008mlgr**; and in different values of diameters** $d_1 = 40 mkm$**;** $d_2 = 35 mkm$**;** $d_3 = 30 mkm$**;** $d_4 = 25 mkm$ **values obtained.**

We construct the differential equation of motion along the OY axis as a result of the action of the roller that cuts the wool fibers. [3]

$$m\ddot{y} = F_{m.q} + mg \cdot \cos\alpha - F_{is} - F_{el} \qquad (1)$$

(1) we determine the homogeneous and specific solutions of the second-order inhomogeneous differential equation, the following external forces are generated under the influence of the roller that cuts the wool fibers.

$F_{m.q}$ - centrifugal force, mg-weight, F_{ish} -friction. $F_{m.q} = m \cdot \omega^2 \cdot l$; $F_{ish} = f \cdot N = f \cdot m \cdot g$; $F_{el} = k_1 \cdot \Delta x$; - the elastic strength of the wool between the supply rollers, ω - angular velocity of the idler shaft ; l -pile length; m- mass of wool fibers , f - coefficient of friction [4]

$$m \cdot \ddot{y} = m \cdot \omega^2 \cdot l + m \cdot g \cdot \cos\alpha - m \cdot g \cdot \sin\alpha - k_1 \cdot \Delta x \qquad (2)$$

(2) divide both sides of the expression by the mass m.

$$\ddot{y} = \omega^2 \cdot l - \frac{k_1 \cdot \Delta x}{m} + g \cdot \cos\alpha - f \cdot g \cdot \sin\alpha \qquad (3)$$

(3) expression $\vartheta = \omega \cdot l \Rightarrow \omega = \frac{\vartheta}{l} = \frac{\dot{y}}{l}$ we put this equality in the above expression.

$$\ddot{y} - \frac{1}{l} \cdot \dot{y}^2 = -\frac{k_1 \cdot \Delta x}{m} + g \cdot \cos\alpha - f \cdot g \cdot \sin\alpha \qquad (4)$$

(4) from the same part of the expression $\ddot{y} = \frac{d(\dot{y})^2}{dt} \cdot \frac{2dy}{2dy} = \frac{d(\dot{y})}{2dt}$ we calculate the homogeneous part using this notation.

$$\frac{d(\dot{y})^2}{dt} - \frac{1}{l} \cdot \dot{y}^2 = 0 \qquad (5)$$

(5) the solution of the equation $\dot{y}^2 = z$ and calculate the homogeneous part.

$\frac{dz}{2dt} - \frac{1}{l} \cdot z = 0 \Rightarrow \frac{dz}{2dt} - \frac{1}{l} \cdot z = 0 \Rightarrow \frac{dz}{z} = \frac{2}{l} \cdot dt$ we differentiate the exspression.[5]

$$\ln z = \frac{2}{l} \cdot t \Rightarrow \; z = e^{\frac{2}{l} \cdot t} \cdot C_1 \qquad (6)$$

to expression $\dot{y}^2 = z$ we express the movement of wool fibers under the influence of a rolling roller along the *OY* axis $\dot{y}^2 = e^{\frac{2}{l} \cdot t} \cdot C_1 \Rightarrow \dot{y} = e^{\frac{t}{l}} \cdot C_1 \Rightarrow y = l \cdot e^{\frac{t}{l}} \cdot C_1$ we determine the value of the constant C_1 using the initial condition . $(y)_{t=0} = l_0$ is equal to $C_1 = \frac{l_0}{l}$

$$y_1 = l_0 \cdot e^{\frac{t}{l}} \; (7)$$

the particular solution of the expression

$$y_2 = M \cdot \cos\omega \cdot t + N \cdot \sin\omega \cdot t \qquad (8)$$

we look for it in the form, taking derivatives from this expression and putting it into equation (4) we determine the invariants.

$$\dot{y}_2 = -M \cdot \omega \cdot \sin\omega \cdot t + N \cdot \omega \cdot \cos\omega \cdot t$$

$$\ddot{y}_2 = -M \cdot \omega^2 \cdot \cos\omega \cdot t - N \cdot \omega^2 \cdot \sin\omega \cdot t$$

$$-M \cdot \omega^2 \cdot \cos\omega \cdot t - N \cdot \omega^2 \cdot \sin\omega \cdot t + \frac{M}{l} \cdot \omega \cdot \sin\omega \cdot t - \frac{N}{l} \cdot \omega \cdot \cos\omega \cdot t = g \cdot \cos\omega \cdot t - f \cdot g \cdot \cos\omega \cdot t \quad (9)$$

We determine the value of A and V by equating the corresponding coefficients of this equation

$$\begin{cases} -M \cdot \omega^2 - \dfrac{N}{l} \cdot \omega = g \\ -N \cdot \omega^2 - \dfrac{M}{l} \cdot \omega = -f \cdot g \end{cases} \quad (10)$$

(10) from the system of equations

$$M = \frac{l \cdot g \cdot (f - l \cdot \omega)}{\omega \cdot (1 - l \cdot \omega)}; N = \frac{l \cdot g \cdot (1 + f \cdot l \cdot \omega)}{\omega \cdot (l^2 \cdot \omega^2 - 1)}$$

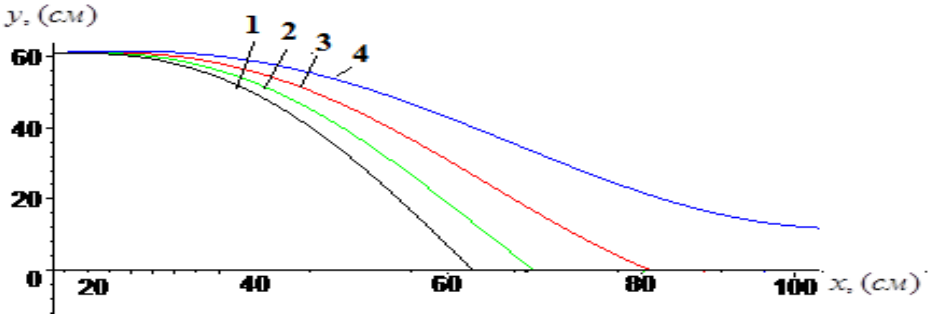
we put the determined values into the equation (8) and determine the specific solution.

$$y_2 = \frac{l \cdot g \cdot (f - l \cdot \omega)}{\omega \cdot (1 - l \cdot \omega)} \cdot \cos\omega \cdot t + \frac{l \cdot g \cdot (1 + f \cdot l \cdot \omega)}{\omega \cdot (l^2 \cdot \omega^2 - 1)} \cdot \sin\omega \cdot t \quad (11)$$

We define the general equation of the trajectory of wool fibers moving along the spinning roller along the OU axis.

$$y = y_1 + y_2 = l_0 \cdot e^{\frac{t}{l}} - \frac{k_1 \cdot \Delta x}{m} + \frac{l \cdot g \cdot (f - l \cdot \omega)}{\omega \cdot (1 - l \cdot \omega)} \cdot \cos\omega \cdot t + \frac{l \cdot g \cdot (1 + f \cdot l \cdot \omega)}{\omega \cdot (l^2 \cdot \omega^2 - 1)} \cdot \sin\omega \cdot t \quad (12)$$

Expression (12) shows the movement along *the OY* axis under the influence of the rolling roller. This expression is analyzed graphically using the Maple program. The following parameter values are given in the calculation: $g = 9{,}81 м/с^2$; l=1,8mm; $\varphi = 80^0$; $\omega = 35 с^{-1}$; m_1=0,023mlgr; m_2=0,023mlgr; m_3=0,014mlgr; $d_1 = 40 mkm$; $d_2 = 35 mkm$; $d_3 = 30 mkm$; $d_4 = 25 mkm$; ρ_{wool}=1.,28÷1,32gr/sm^3.



6 **. Different masses of wool fibers separated on the OU axis under the influence of a rolling roller** m_1=0,023mlgr**;** m_2=0,023mlgr**;** m_3=0,014mlgr**;** m_4=0,008mlgr **graph depending on the transmission distances in values**

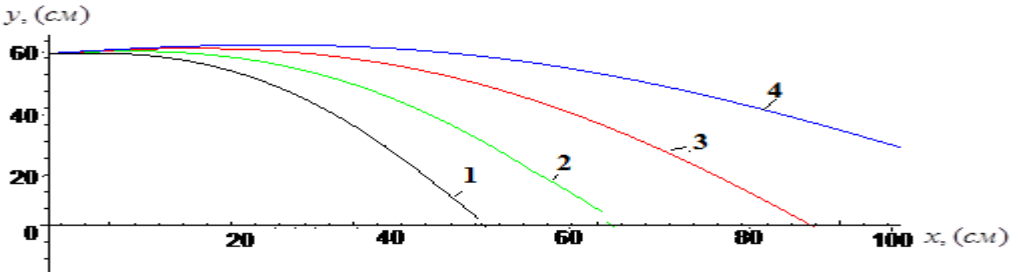


Figure 7. Different diameters of wool fibers separated on the OY axis under the influence of a pinching roller $d_1 = 40 mkm$; $d_2 = 35 mkm$; $d_3 = 30 mkm$; $d_4 = 25 mkm$; **graph depending on the transmission distances in values**

Conclusion: The trajectory of movement of separated wool fibers along the OY axis is presented. The angle of coverage of separated wool fibers and its change over time were determined.

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SEPARATION OF IMPURITIES IN WOOL FIBER AND ANALYSIS OF GEOMETRIC CHARACTERISTICS

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Annotasiya: ushbu maqolada uy va yaylov sharoitida boqilgan qorako‘l va jaydari zotli qo‘y junlari tarkibidagi iflosliklarni qiyin ajraladigan hamda oson ajraladigan guruhlarga ajratilgan holda o‘rganildi.

Kalit so‘zlari: o‘simlik qoldiqlari, mineral qoldiqlari, yog‘-ter moddalari, yuvilgan va yuvilmagan tola

Аннотация: данная статья посвящена исследованию сортировки шерсти овец местной породы и породы каракул, выкормленных в домашних условиях и условиях пастбищ, в зависимости от степени загрязнений

Ключевые слова: растительные остатки, минеральные остатки, масла и потовые вещества, промытое и непромытое волокно

Abstract: This article is devoted to the study of sorting wool from sheep of the local breed and the Karakul breed, raised at home and in pasture conditions, depending on the degree of contamination

Keywords: vegetable residues, mineral residues, oils and sweat substances, washed and unwashed fibers

Introduction. Wool processing enterprises play an important role in the production of wool fiber products. These enterprises process wool and obtain wool fiber, which is delivered as raw material to spinning enterprises [1]. The quality of the wool fiber affects the quality of the finished product, because a quality product can be produced from a quality fiber. This, in turn, requires the

study of the processes carried out in primary wool processing enterprises, the problems of fine and coarse wool sorting [2].

Methodology. In the research, the wool of sheep raised under two seasons of house and pasture conditions was studied. Wool of Karakul and Jaydari sheep was taken as a sample [3]. It was studied by separating the hard-to-separate, smooth-stemmed, and other parts of the plant into easily-separated groups, such as sedum and callus. The results of the study are presented in Table 1.

Table 1

Amount of plant residues in wool according to shearing season

No	Sheep breed	Spring cut , %			Autumn cut , %		
		In the meadow	At home	Fiber output	In the meadow	At home	Fiber output
1	Karakul	3.4/2.8 *	0.3/3.1	96.3/94.1	2.3/4.6	-/1.6	97.7/93.8
2	Jaydari	3.1/2.3	0.2/2.7	96.7/95	1.9/2.6	-/1.4	98.1/96

Figure 1 shows the amount of hard-to-separate and easily-separated plant residues in the denominator.

As can be seen from Table 1, the proportion of hard-to-separate group is higher in pasture-raised spring sheared wool, and less in house-raised ones. It turned out that autumn cuttings have fewer residues of this type compared to spring cuttings. Degradable plant residues are present in the wool in both seasons and are relatively less in the house-raised ones. Wools sheared from Jaydari sheep have less plant residues of both types compared to Karakul. The abundance of coarse fibers in Jaydari sheep wool causes a small amount of adhesion of plant residues [4]. The abundance of tivite fibers in Karakul, in turn, causes a lot of plant remains to stick together. In addition, the amount of plant residues in the composition of sheep wool depends on the agrotechnics of animal feeding, climatic conditions, type of feed, etc.

Table 2

Amount of waste in spring sheared wool

No	Waste types	Sheep breeds according to came out share , %	
		Karakul	Jaydari
1	Forty period waste	0.65 ±0.020	1.1 ±0.030
2	Plant remains	3.4 ±0.13	3.1 ±0.92
3	Mineral waste	4.3 ±0.197	4.8 ±0.210
4	Fat - sweat substances	11.0 ±0.681	11.3 ±0.768
5	Total waste	19.35	20.3
6	Amount of pure wool	80.65	79.7

After the wool fiber is sheared from the sheep, it contains not only plant residues, but also mineral and fat-sweat substances. They have a different character according to the degree of settlement in the fiber. Samples were taken according to the methodological instructions given in GOST 20270-74 for the determination of waste in raw materials. The researches were carried out on spring shearing raw materials of Karakul and Jaydari sheep bred in livestock farms. The results are presented in Table 7 [5].

A B V G

Figure 1. A - plant residues, B - mineral residues, V - washed fiber, G - unwashed fiber.

The appearance of the washed and unwashed fibers and the content of impurities were analyzed under a Nikon microscope (Fig . 1) .

Plant residues, as well as mineral and fatty substances contained in wool fiber, have different characteristics according to the degree of their settlement in the fiber.

Plant remains and mineral impurities hand and using a comb analyzer side is separated [6]. Mineral impurities include sheep manure, soil and sand. Oily substances A sample of 1 gram is taken, carbonized and washed for 12-15 minutes without any external influence. The percentage of fatty substances in the samples is 11%. The proportion of soft, semi-soft, semi-coarse and coarse fibers in the wool fibers grown in our region was checked in 3 options. The results of sorting washed local wool fibers according to length and mass: fine wool fibers accounted for 48.9%, semi-coarse wool fibers for 2.3% and coarse wool fibers for 33%.

This is close to the indicators of the total amount of wool produced in the republics of the Commonwealth of Independent States by category [3].

The semi-periodic tensile deformation of wool was tested on the AGS-H instrument under the conditions of the TTESI CentexUz certification test laboratory. Based on the obtained results, the conditional and calculated diameters of the local wool fiber were determined and the spinning ability was designed. For this purpose, the absolute breaking strength for wool yarn and the models of yarn breaking rate [4] proposed by scientists of MGTU were used.

Analysys And Discussion. The results show that spring wool fibers contain 0.65-1.1% shearing waste, 3.1-3.4% plant residues, 4.3-4.8% mineral and 11-11.3% fat-sweat. substances are present.

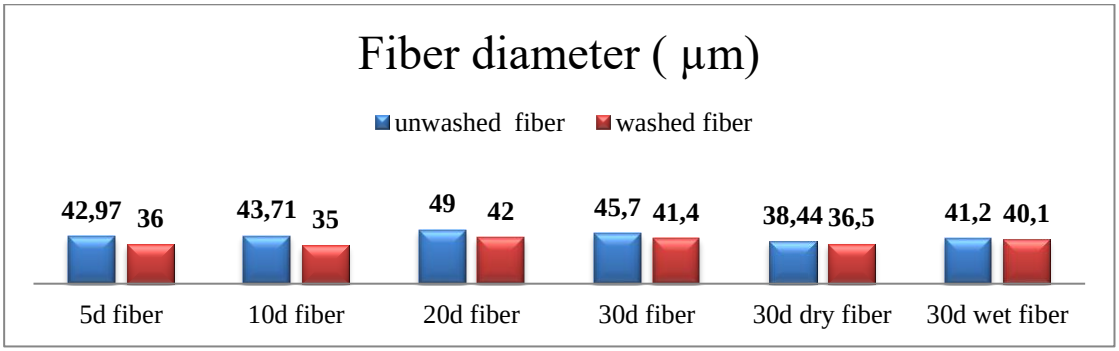

Figure 2. of a wool fiber in an objective-ocular micrometer view of the dimensions of the diameter.

In Figure 2 above, at different times and conditions a histogram of the dependence of the diameter of the stored fibers on the stored day is presented.

In the wool of Karakol and Jaidari sheep, waste is around 19-20%, and mineral waste is more in Jaidari wool. The reason for this is that Jaidari sheep are coarser and have more fibers corresponding to 1 mm ^{2} compared to Karakol. Coarse wool fibers are somewhat sparse compared to fine wool, which makes it easier to add various objects from the environment (cotton, thread, film, paper, etc.) to the raw material. Therefore, in the wool of Karakol and Jaidari sheep, it is around 0.65-1.1% in wool. The diameter of the wool fibers stored in different conditions and periods was determined according to the methods of determining the geometric parameters of the wool fiber, and its histogram is presented in Figure 2.

As can be seen in the histogram, the diameters of the fibers before and after washing are significantly different from each other. The reason for this is that the dust, oil and sweat substances on the fiber surface disappear after washing. It was found out from the experiments that the diameters of those who tested the fibers under the sunlight for the first 5, 10, 20 days differed from each other, while those who tested them in wet conditions for 30 days did not notice any difference. The reason for this may be that the dust and sweat substances on the surface of the fiber are separated in humid

conditions. According to the calculation results, the diagram is as follows was hit (Fig. 3) .

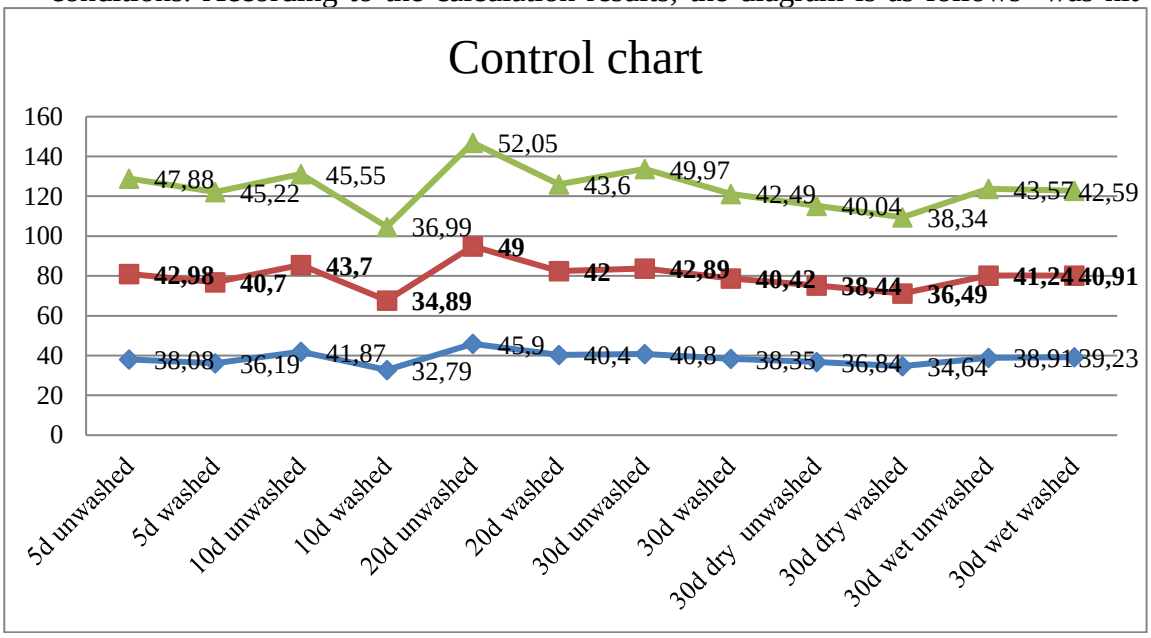

Figure 3. Control chart by diameter.

The control chart shows the shelf life of washed and unwashed fibers on the abscissa axis, the fiber diameter (μm) on the ordinate axis, and the limits of guaranteed errors for this indicator.

Conclusion. According to the analysis, the guaranteed errors of 40.7-43.7 μm diameter of wool fibers stored without washing for 5 days and 10 days are close to each other that the diameter of 10-day washed wool fibers is 34.89 ± 2.1, that is, semi-coarse, and the rest belong to coarse wool.

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UDK 61.4.8.084(075)

RESEARCH ON THE DEVELOPMENT OF MEASURES AND METHODS FOR MANAGING INJURIES AND OCCUPATIONAL DISEASES

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Anotatsiya - Maqolada mehnatni muhofaza qilishni tashkil etish va boshqarish tizimi, baxtsiz hodisalarning oldini olish, ishlab chiqarishdagi shikastlanishlar holati va xavfsiz mehnat sharoitlarini ta'minlash bilan bog‘liq masalalarni huquqiy tartibga solish masalalari ko‘rib chiqiladi, shuningdek, respublika va xorijiy mamlakatlarda mehnatni muhofaza qilish bo‘yicha ishlarni tashkil etish tizimini tartibga soluvchi me'yoriy-huquqiy baza taqdim etiladi.

Kalit so`zlar: mehnatni muhofaza qilish, shikastlanishlar, baxtsiz hodisalar, jaroxatlanish, monitoring, dastur, kasbiy xavflar.

Аннотация - В статье рассмотрены вопросы системы управления и организации охраны труда, состояние производственного травматизма и правовое регулирование вопросов, связанных с обеспечением безопасных условий труда, а также представлена нормативно-

правовая база в республике и зарубежных странах, регламентирующая порядок организации работ для предотвращения несчастных случаев.

Ключевые слова: охрана труда, несчастные случаи, травматизм, мониторинг, программа, профессиональные риски.

Annotation - The article discusses issues of the management system and organization of labor protection, the state of industrial injuries and legal regulation of issues related to ensuring safe working conditions, and also presents the regulatory framework in the republic and foreign countries regulating the procedure for organizing work to prevent accidents.

Key words: labor protection, injuries, accidents, injuries, monitoring, program, occupational hazards.

Introduction. Injuries and mortality from external causes make a significant contribution to the demographic situation of most economically developed countries of the world. Every day, an average of 5 thousand people die from accidents and diseases at work, this is from 2 to 2.3 million per year, of which 350 thousand are accidents at work and 1.7-2 million are caused by occupational diseases. Research in the field of labor protection is being carried out around the world to solve a number of problematic issues in this system, one of which is serious shortcomings in the training and education of personnel, and the involvement of persons who have not undergone labor safety training in performing work. Despite the general downward trend, injury rates at production facilities are significantly higher than in other sectors of the economy. In international practice, risk monitoring is the cornerstone of production management systems. The concept of occupational risk management, the transition to which is currently underway, involves a change in priorities, a shift in emphasis from response measures to accidents within the framework of the traditional monitoring system to preventive ones. Therefore, the assessment of working conditions is inevitably combined with protection against risks, with the regulation of the safe behavior of workers in given external conditions.

Literature review. The issues of systematization of socio-economic, organizational, technical, sanitary and hygienic, therapeutic and preventive principles and regulatory support for occupational safety issues, as well as the problem of reducing the risk of injury and occupational diseases in Uzbekistan were studied by such scientists as O.R. Yuldashev, S. S.Sulaimanov, L.I.Petrosova, Sh.M.Narziev, K.A.Atabaev and others. Scientific research in this area is one of the most relevant areas in ensuring occupational safety in general both in the Republic of Uzbekistan and in the world. As a result of the research conducted by the above scientists, certain results were achieved, but the currently developed methods and techniques require a more in-depth study of the occupational safety management system, the development of measures to minimize accidents and injuries at work, improvement of the existing system for monitoring and assessing working conditions and their application in practice has not been sufficiently studied.

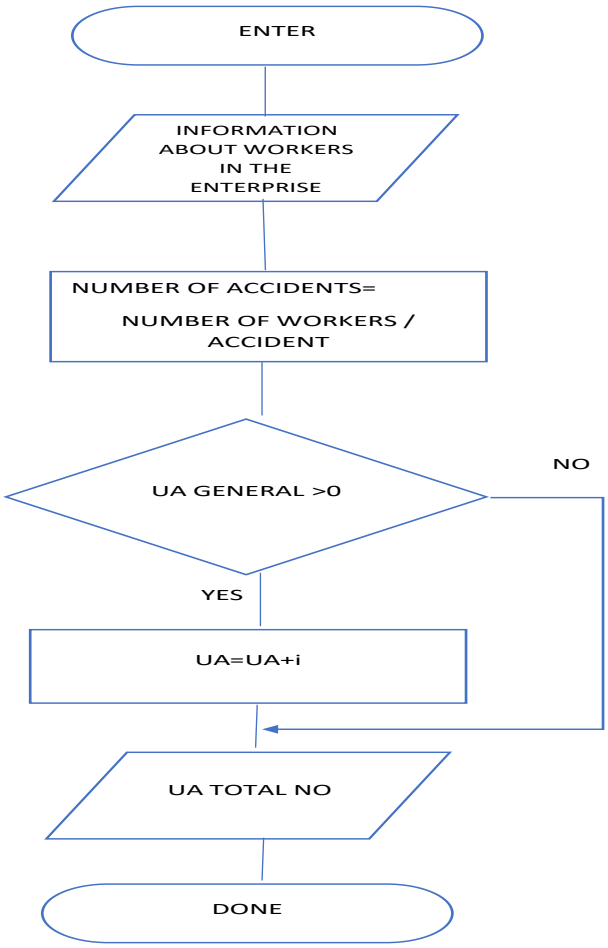
Analysis. The studies provide an analysis of measures to increase funding for preventive measures to reduce industrial injuries and occupational diseases; the level of fatal injuries in industry and agriculture is currently several times higher than that of most European countries. The degree of reliability of registered cases of fatal injuries is characterized by the ratio of the total number of registered injuries to the number of cases with fatal injuries. Methods for assessing the labor protection system at enterprises of the coal, mining and chemical industries, analysis of current documents and materials provided by enterprises, visual observation of work processes when visiting facilities and departments, daily activities of personnel in the field of labor protection management system requirements are considered. Research has established that 75% of accidents are caused by organizational reasons, such as unsatisfactory organization of work, violations of labor protection requirements, deficiencies in training, and violations of labor discipline. carried out in organizations to identify the causes that lead to accidents and develop measures aimed at preventing them.

Discussion. When analyzing industrial injuries, various methods are used to identify and eliminate their causes, one of which is statistical. It is based on an analysis of the causes of injuries over a certain period of time using official documents recording accidents that have occurred. According to data from one of the studied enterprises, the results of an analysis of accidents based on the severity

of injuries and damage received are presented. In the divisions of the organization, conducting an analysis, it was determined that the most injury-prone divisions are the Branch "ZhT" (40%), the Branch "Razrez Angrensky" (25%) and the Branch "Razrez Apartak" (20%). Below is a comparative table of accidents that occurred in the structural divisions of Uzbekugol JSC in the period from 2020 to 2023.

It is based on an analysis of the causes of injuries for a certain period of time according to official documents registering accidents that have occurred. Thanks to this method, comparative dynamics of injuries is obtained. With an in-depth statistical analysis by type of work, information about the victims (gender, age, profession, experience, etc.) and data on the time of the incident (year, month, day, shift, hour, etc.) are analyzed [2]. Here are a few examples of accidents with different outcomes that occurred at the enterprises of Uzbekugol JSC during the first half of 2023.

Enterprise information block - In this window, the following information related to the enterprise is displayed on the screen.



Picture 1. Algorithm for calculating the number of accidents in the enterprise

An analysis of occupational injuries depending on the type of economic activity showed that the types of economic activity with the largest number of injured included such activities as the coal industry, transport, agriculture, construction, and mining. According to statistics [3], the main types of accidents (hereinafter referred to as accidents) are: - falling from a height (33.3%); - impact of moving objects and parts (25%); – traffic accident (14.2%); - falling, collapse, collapses of objects, materials (12.5%); - other reasons (15%). Traditionally, more than 75% of accidents are caused by organizational reasons, such as unsatisfactory organization of work, violations of labor protection requirements, deficiencies in training, violations of labor discipline. is carried out in organizations to identify the causes that lead to accidents and develop measures aimed at preventing them. In the next window, complete information about the company's employees will be displayed. By dividing the number of accidents at the enterprise by the number of employees, we will be able to display the %

coefficient of the total number of accidents at the enterprise. If an accident occurred at the enterprise within a certain period of time, the program displays the total number of accidents in a diagram. Using this window, you can see a list of workers who have passed the instruction, if each worker has not passed one of the 5 listed instructions, then this worker is considered not to have passed the instruction, if he passed all 5 instructions, passed the instruction within the specified time, the program considers this employee to have completely passed the instruction and displays it on the screen.

Figure 2. Information about the company's employees

After entering the data, the program automatically calculates all the workers who passed the guidelines and identifies the workers whose guidelines are expiring with a red line on the screen. Whether employees in the enterprise follow the rules of technical safety and whether they have passed the guidelines. Using this window, you can see the list of workers who have passed the guidelines, if each worker meets one of the 5 guidelines listed. if not, this worker is considered not to have passed the instruction, if he has passed all 5 instructions, if he has passed the instruction within the specified period, the program will exclude this employee from the instruction considers it completely passed and displays it on the screen. After entering the data, the program automatically calculates all the workers who passed the guidelines and identifies the workers whose guidelines are expiring with a red line on the screen. To prevent accidents and reduce their number, it is necessary to identify existing hazards and assess the risks of these hazards. For this purpose, in the course of the research, an algorithm was developed for determining the number of accidents at an enterprise, allowing to minimize existing risks and factors affecting production.

Conclusion. Thus, the main objective of the developed measures and methods is to increase the efficiency of the system for managing professional risks of workers, which consists in providing the possibility of information support to decision makers:

- at the industry level - in the development and implementation of preventive policies and programs for the protection of “at-risk groups”, i.e. workers of the most dangerous professions of professional groups exposed to high levels of risks;
- at the enterprise level - in the development and implementation of plans, processes and procedures for identifying, analyzing, ranking and reducing the levels of the most dangerous systemic risk factors for workers in certain professions and/or professional groups;
- at the workplace level - in the development and implementation of methods and means of identifying, preventing and eliminating the causes and circumstances of accidents.

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ACTUAL PROBLEMS IN MODERN ART AND ARCHITECTURE

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DEVELOPING A MODERN COLLECTION TAKING INTO ACCOUNT THE CHARACTERISTICS OF UZBEK NATIONAL FABRICS

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Annotasiya. Ushbu maqolada milliy matolarning o‘ziga xos xususiyatlarini o‘rganish asosida zamonaviy to‘plamlarni ishlab chiqish va bu matolarning fizik-mexanik hususiyatlari bo‘lgan havo o‘tkazuvchanligi, uzayish va ishqalanishga ta’siri, gigroskopikligi, chidamliligi, kirishuvchanligi, rangining chiqish darajasi, bichimda shakl saqlovchanligi kabi sifatlari o‘rganilgan va tahlil etilgan.

Kalit so‘zlar: kiyim, mato, to‘qish, san’at, ipakchilik, gigiyena, gigroskopik, ekologiya, baxmal, xonatlas, adras, beqasam, shoyi.

Аннотация: В данной статье рассматривается анализ и изучение физико-механических характеристик национальных тканей и их специфические свойства, такие как воздухопроницаемость, влияние на удлинения и трения, гигроскопичность, формоустойчивость, долговечность, сминаемость, цветопередача, дизайнерское решение при разработке современной коллекции.

Ключевые слова: одежда, ткань, ткачество, искусство, шелководство, гигиена, гигроскопичность, экология, бархат, быт, адрас, бекасам, шелк.

Annotation: In this article, the development of modern collections based on the study of the specific characteristics of national fabrics and the physical and mechanical properties of these fabrics, such as air permeability, elongation and friction effects, hygroscopicity, durability, permeability, color rendering, design properties such as shape retention were studied and analyzed.

Key words: clothing, fabric, weaving, art, sericulture, hygiene, hygroscopic, ecology, velvet, household, adras, bekasam, silk.

Introduction. Taking into account the characteristics of national fabrics by using local raw materials, expanding the range of new shirt fabrics, increasing the volume of processing of local textile raw materials, introducing the latest technology and equipment to enterprises in the field in cooperation with advanced foreign companies. development of a modern collection is one of the urgent issues.[1]

The composition of the fiber mixture and the percentage ratio of various fibers in it affect various indicators of gasification. For example, 100% cotton gauzes have high hygienic properties, but they are wrinkled. The addition of synthetic fibers to the cotton fiber reduces the wrinkling of the gauze, and the addition of staple fiber or kapron increases its elasticity.[4]

There are physical and hygienic requirements for clothing fabrics. Its weight, thickness, air permeability, and moisture permeability are taken into account. In addition, it is necessary to take into account the fact that the fabric used to make clothes reflects light, is soft, does not lose its original appearance when washed and ironed, can be quickly cleaned from dirt, and absorbs dust.

From the point of view of hygiene, a fluffy dress creates a unique microclimate in the body. This not only improves the health of a person, but also improves his mood. Clothes are divided into several types according to heat transfer. Thread, linen and silk fabrics conduct heat better. Clothes made of wool and yarn are average in terms of heat transfer.[5]

literature review. Depending on the season, different clothes are worn, that is, in winter, several clothes are worn on top of each other. In this case, the air between the clothes conducts less heat. At the same time, it protects the body from changes in the temperature of the external environment. Choosing the right clothes according to the season is important for maintaining health.[6]

The climate of Central Asia is dry and sharply continental. In summer, the days are very hot, humidity is very low. In spring and autumn, the temperature is very variable, strong winds blow, and humidity is high. In winter, the air temperature is low and the current is strong. Therefore, depending on the air temperature, it is advisable to choose clothes taking into account the hygienic properties.[7]

Clothing fabric should keep electrostatic charges as low as possible, and should be impermeable to small particles (dust, bacteria, etc.) that affect the body. Underwear (that touches the body) should be moisture-permeable, air-permeable and hygroscopic. Such clothing has the ability to expel carbon dioxide from the body, sweat and other substances released by the skin, including water-soluble vitamins, toxic compounds formed in metabolism. Also, the clothing fabric should be easy to wash and clean. Clothing should be suitable for the season, gender, age, body, height and job.[8]

Fabrics for clothing should meet the basic hygienic requirements in terms of: good air permeability even when dry and wet; sweat-wicking and quick-drying in heat; which reflects sunlight and does not allow it to affect the skin; does not stick to the body (does not prevent sweating); it should be free of electrostatic charges.

Cotton fabrics cannot provide high air permeability in hot areas, high permeability to sunlight. Light white linen fabrics reflect well almost the entire spectrum of sunlight.

We can admit that the art of weaving our national fabrics, as well as the production of natural silk fiber, which is one of the raw materials necessary for these fabrics, is developing rapidly. The luster of our national fabrics, such as khonatlas, adras, bekasam, silk, and olacha, the eye-pleasing patterns, and the harmony of colors amaze everyone.[9]

We are all proud that in different countries of the world, modern style dresses are made from our beautiful fabrics and worn by people. Modernity and the spirit of nationalism are combined in the works of designers who create a collection of dresses using our natural silk fabrics.

Research Methodology. It is worth noting that Uzbek national fabrics woven from natural cotton and silk fibers are considered environmentally friendly products that not only have a positive effect on human health, but also do not harm the environment. In terms of protection of ecology, which is a current problem and concerns the whole world, it is appropriate if clothing designers also make their contribution and create clothing collections using natural fabrics. Of course, Uzbek national fabrics, in addition to their unique elegance, are made of natural fibers and find their buyers from all over the world.

It is known that gazlams made of natural silk fibers and dresses made from them always attract attention with their beauty and lightness. These fabrics, which are becoming more popular year after year, are influenced by modern clothes, and they also influence the design of current clothes through their operational and hygienic properties and quality indicators.

Taking into account the exploitative properties of this national treasure - our fabrics - it is not appropriate to make everyday clothes from them, intended for permanent wear. Before explaining why we have come to such a stop, we would like to draw attention to the problem of operational properties of fabrics.

Dresses made of satin or satin fabrics can retain some of their beauty and durability when they are mostly chemically cleaned. However, when washed in a washing machine, at home, if it is not treated with care, the fabric will not retain its appearance.

Also, taking into account that it is difficult to pass air, if clothes are sewn from satin in a wider shape, such a dress is not very suitable for our girls and women. A tight-fitting dress made of satin, after only a few wears, the fibers will come apart at the seams and around the seam. Therefore, it is appropriate to design and sew clothes for events and holidays from satin, not everyday clothes that are worn all the time. Our adras fabrics, which attract attention with various patterns, are distinguished by their easy sewing.

Analysis And Results. Excellent velvet fabric is considered complex in terms of weaving, it is thick and heavy compared to other Uzbek national fabrics, it is woven from cotton and silk threads. Master artisans produce velvet fabric mainly decorated with geometric and abr patterns. Despite the thickness of this fabric, it retains good heat in cold and humid temperatures, as well as having air permeability properties.

Due to the fact that both silk fiber and cotton thread fiber are used in the weaving of Adras, the air permeability of this fabric is relatively good. However, like satin, water has its effect on the elasticity of adras. When Adras is washed at home, its beauty decreases. Silk (exelsior) is made of pure silk, it attracts attention with its very fine weave and softness. Dyeing this harir fabric in batik style and making various scarves is very popular nowadays.[14]

But this fabric has sewing problems. It is not appropriate to create an everyday dress from silk. Of course, we do not want to spoil our national fabrics. After all, they are our national pride! However, if this beauty is not used in its proper place, i.e., if our fabrics are made only for festive, specific days, we would say that it is appropriate. Our young designers are also mainly creating stage costumes. This, in my opinion, leads to the limitation of styles in modern fashion.

Conclusion And Recommendations. In order to avoid such a situation, it is necessary to pay attention to the bending process of the fibers used in weaving our fabrics. When we compare our old national fabrics with the ones being woven now, we can see that ancient satin-u bekasam has high quality indicators, and its color is preserved for a very long time. It is clear from this that at present, defects in dyeing of silk fibers and perhaps some negligence are allowed.

In conclusion, we would like to say that if our cloth weaving craftsmen restore ancient technologies, re-learn the secret of natural dyes, the dyeing process and apply this method to the work process, and take into account the characteristics of excellent national fabrics in all aspects, modern the development of dresses is underway, as a result, the opportunity for our designers to use all types of national fabrics in the production of everyday clothes will increase.

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METHODS OF REPRESENTATION AND DESIGN OF CLOTHING IN A 3D VIRTUAL ENVIRONMENT

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Annotatsiya: Ushbu maqolada uch o‘lchovli virtual muhitda kiyimlarni loyihalash usullari va yangi kiyim dizaynini ishlab chiqish algoritmi dizaynerning loyiha topshirig'ini tahlil qilish, dizaynni hisoblash va grafik qurish va konstruktiv modellashtirish usullaridan foydalangan holda asl shablonni yanada o‘zgartirishni o‘z ichiga oladi.

Kalit so‘zlar: konstruktsiya, kiyim-kechak, eskiz, dizayn, kiyim-kechak sanoati, to‘qimachilik sanoati.

Аннотация: В данной статье представлены методы проектирования одежды в трехмерной виртуальной среде и алгоритм разработки нового дизайна одежды, включающий анализ эскизного задания дизайнера, расчетное и графическое построение дизайна, а также дальнейшее преобразование исходного шаблона с помощью конструктива. приемы моделирования.

Ключевые слова: конструкция, одежда, эскиз, проектирование, швейная промышленность, текстильная промышленность.

Annotation: This article presents methods for designing clothing in a three-dimensional virtual environment and an algorithm for developing a new clothing design includes analysis of the designer's draft assignment, computational and graphic construction of the design, and further transformation of the original template using constructive modeling techniques.

Key words: Construction, clothing, sketch, design, clothing industry, textile industry.

Introduction. Designs and basic dimensional characteristics of the human figure that determine the external shape of the human figure. Standardization of basic anthropometric characteristics contributed to achieving a more complete correspondence of finished clothing to the figures of adults and children.

The process of obtaining developments of structural parts of designed garments is carried out in the following sequence of stages: construction of primary drawings of parts of the basic structure (BC); development of the initial model design (IMC); formation of a model structure (MC).

The algorithm for developing a new clothing design includes analysis of the designer's sketch assignment, computational and graphic construction of the BC, further transformation of the original template using constructive modeling techniques, preparation of design and technological documentation for the manufacture of the sample, assessment of the quality of fit of the resulting design based on anthropodynamic compliance with the given figure and the absence of fit defects , assessment of compliance of the resulting external shape of the product with the designer's sketch.

Computer-aided clothing design systems have appeared in the domestic clothing industry, initially for planar (2D) and then for volumetric (3D) design of garments. Modern "computer-aided design" (CAD–eng. Computer-aided design/CAD) represents organizational and technical support for the implementation of automated information technology for design, including the creation, modification, analysis and optimization of the design of an object or its technical drawings, consists of personnel and a set of technical, software and other automation tools, the use of which allows to increase the productivity of the designer, improve quality of product design, improve document flow [1].

In two-dimensional (2D) space, CAD can be used to create curves and planar figures, and in three-dimensional (3D) space, it can be used to create complex curved surfaces or solids [2].

Literature Review. The method of interactive virtual clothing design was proposed by British scientists at Queen's University in Belfast B. Hinds and J. McCartney (Hinds B.K., McCartney J.). Based on a virtual mannequin of the human figure, individual clothing parts were formed, combined into a complex shaped surface, the shape or dimensions of which could be easily changed by simple data input. The authors immediately, along with the efficiency of saving the designer's efforts, noted the problem of assessing the quality of fit of the designed products [3].

At the present stage, researchers Euratex (The European apparel and textile organization), (Walter L., et al.) a new approach to the design and production of clothing, called LEAPFROG (Leadership for European Apparel Production From Research along Original Guidelines / Guidelines for European clothing manufacturers). This industrial paradigm requires a reduction in the industrial cycle of a product from sketch to retail sale, taking into account consumer demand, using high technologies and the results of scientific research on materials, SAP and clothing manufacturing [4].

On the need to change the paradigm of traditional hand-tailored men's suits made to order (bespoke) for an individual figure (made-to-measure) to a more productive approach to the preparation of semi-finished products (demi-bespoke) evidenced by the results of an ethnographic study of traditional menswear tailoring in London, conducted at the London College of Fashion, University of the Arts London through in-depth interviews (Ross F.). Technological changes have already been introduced into the practical activities of London tailors, such as measuring sizes by scanning the human figure, computerization of production, multicultural methods of designing and sewing products (Multicultural tailoring style) [5]. Thus, we can talk about a trend of mutually beneficial convergence of mass and individual production in the interests of consumers thanks to the intensive innovative development of the industry.

Research Methodology. Researchers at the University of Manchester (Sayem A.S.M., et al.) it is stated that there were no CAD clothing capable of providing planar development of virtual samples (pattern flattening technique) in industrial conditions. Although virtual clothing design is already carried out by transformations from both «2D в 3D», and from «3D к 2D», which allows you to take into account the behavior of the material in a 3D model, display the product on a virtual mannequin of any figure, change the design of clothing taking into account the body features of realistic figures [6].

To carry out three-dimensional clothing design, technologies of computer vision, computer graphics, three-dimensional modeling, visualization (rendering), and three-dimensional reconstruction of objects are used.

Methods for collecting, processing, analyzing and automated integration of data about multidimensional real-world objects to create their digital image are called computer vision, which underlies automated image analysis for industrial control or information organization, for example, creating databases through information indexing or sequence of images, object recognition (Pattern

recognition), their assessments (Freeman H.; Klette R., et al.; Chen C.; Hosny K., Calleja J.) [7, 8, 9, 10, 11].

To process visual information obtained from the real world and synthesize (create) images using computers, a technology called computer graphics is used. (Computer graphics) [12, 13].

The difference between 3D computer graphics and two-dimensional computer graphics is the ability to graphically represent three-dimensional geometric data (often Cartesian) stored in a computer for visualizing 2D images based on algorithms for creating wireframe models using 2D vector graphics or three-dimensional models using 2D raster graphics. [14, 15].

Three-dimensional modeling (3D modeling) is the process of developing a mathematical representation of any three-dimensional surface of an object using special software to obtain a product called a 3D model (a two-dimensional image of which is formed by visualization). Solid modeling is a computer three-dimensional representation of an object that allows one to describe the physical properties of this object in CAD: mass, center of gravity, strength, etc. [16, 17].

Rendering or 3D visualization (3D rendering) is the process of obtaining a flat digital raster image (picture) from a model using a computer program, where the model is a description of any objects or phenomena in a strictly defined language or in the form of a data structure [18, 19, 20]. Volume rendering is a method of forming an image that includes both the general appearance and the internal structure of a three-dimensional object [21]. The display of three-dimensional objects on a plane is called rendering (visualization).

Three-dimensional reconstruction (3D reconstruction) is the process of obtaining the shape and appearance of real objects, performed by passive or active methods. If the shape of the model can change over time, we talk about non-rigid or spatio-temporal reconstruction of a three-dimensional object [22].

Scientists at Stanford University (Girod B., et al.) noted that over the last decade there has been a unification of 3D image analysis (i.e. computer vision) and their synthesis (i.e. computer graphics) thanks to the initial acquisition of images by video shooting or scanning , further analysis, recognition and interpretation of images, 3D geometric modeling using polygonal meshes or splines, visualization of 3D images.

Analysis And Results. Traditionally, CAD is divided into universal and specialized. Universal design systems are quickly enriched with new technologies, since their main purpose is to solve complex general engineering problems in various industries. The open architecture of universal CAD allows you to use their graphical and mathematical apparatus when creating specialized CAD.

An analysis of CAD applicable for clothing design is presented in Table A2 of Appendix A, where the following systems are highlighted as universal CAD:

1) AutoCAD system, implementing 2D and 3D design technologies;

2) 3D Studio Max program, developed by Discreet Inc for creating photorealistic objects and their animation based on 3D graphics, modeling the geometric and physical properties of any three-dimensional objects in statics and dynamics with lighting simulation;

3) Maya system for modeling, animation and creating various effects, including modules for modeling Maya Cloth and Maya Fur;

4) Amapi 3DTM system for building 3D models;

5) TrueSpace software package for modeling, surface editing, shading and animation;

6) LightWave 3D program for modeling, shading and animating images.

In all of the above systems, the principles for constructing the surface of clothing are the same, so the choice of one or another application depends mainly on the user's preferences and the cost of the software. In addition, it is important to consider the possibility of adapting models obtained in universal CAD to the requirements of specialized systems, since often when designing clothing there is a need to export or import 3D models and 2D product design drawings from a universal system to a specialized one and vice versa.

Modern specialized SAP for clothing contain modules for both two-dimensional (2D) and three-dimensional (3D) design of the external shape of garments and are based on the principles of

dressing or unfolding. The diagram for specifying the surface of the consumer's figure and designing the external form of clothing in SAP is presented.

As a rule, two types of sequences of actions are performed in CAD clothing: 1) Dressing - generation according to individual sizes or selection from an existing database of a three-dimensional image of a given figure (virtual mannequin), creation of drawings of patterns of product design details, formation of a three-dimensional image of the product on a virtual figure to be worn by connecting flat drawings of product parts into a spatial surface, simulating the behavior of the fabric. 2) Deployment - generation according to individual dimensions or selection from an existing database of a three-dimensional virtual mannequin of a given human figure, creation of a three-dimensional virtual model of the product on this figure, simulation of the behavior of the fabric, development of a spatial surface onto a plane with its division into flat structural parts.

Creating the outer shape of clothing in 3D CAD has two main scenarios: for a fitted and loose silhouette. In the first case, when designing clothes, a virtual human figure is directly copied, and in the second case, flat parts of the clothing design can be used that have specified increases in freedom of fit.

Conclusion And Recommendations. The main modules of modern CAD clothing are the stages of working with flat scans of the surface of clothing or the spatial surface of a virtual garment. Designing clothing in CAD covers both shoulder and waist products, the basic shapes of which can be selected from a data library or built directly on a virtual mannequin of a given human figure. To assess the level of existing technical solutions for CAD clothing, a review of inventions in the field of computerized construction of clothing structures and patterns, and methods for designing garments was carried out.

The first domestic method of computer modeling of clothing, proposed by I.S. Zakom, R.I. Sizova and O.D. Marchenko[23], included the development of the basic design of clothing from assembly units, the application of structural and decorative elements from a systematized database, and the layout of patterns for clothing parts.

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DANGEROUS AND HARMFUL WORK FACTORS OF WORKERS WORKING IN A MINING-METALLURGY COMBINATION

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Annotatsiya: Maqolada turli sharoitlarda ish joylarda xavfli va zararli ishlab chiqarish omillari tahlil qilindi. Ushbu omillarni hisobga olgan holda va uning himoya xususiyatlarini saqlab qolish tamoyiliga asoslanib, metallurgiya ishlab chiqarishida kasbiy xavfni aniqlash kerak.

Tayanch so‘zlar: metallurgiya, ximoya, maxsus kiyim, omil, sanoat.

Аннотация: В статье проанализированы опасные и вредные производственные факторы на рабочих местах с различными условиями. С учетом этих факторов, и исходя из принципа сохранения его защитных свойств следует определить профессиональный риск в металлургическом производстве.

Ключевые слова: металлургия, добыча, защита, спецодежда, фактор, промышленность.

Annotation: The article analyzes dangerous and harmful production factors in workplaces with various conditions. Taking into account these factors and based on the principle of maintaining its protective properties, it is necessary to determine the occupational risk in metallurgical production.

Key words: metallurgy, special clothing, factor, industry.

Introduction. Concepts and definitions used in the discussion of real problems in production enterprises of Uzbekistan have a strictly defined meaning only within the framework of theories that simplify complex reality. A person is exposed to a number of factors in the industrial environment during his professional activity. Among them, one of the leading places is occupied by physical factors: noise, vibration, electromagnetic radiation, microclimate, etc. Under certain conditions, each of them, as well as their various combinations, can lead to a significant strain on the human body's ability to adapt and subsequent maladaptation. The effect of these factors is determined by their physical characteristics and the functional state of the leading systems of the body, its individual sensitivity to stimuli.

Research Methodology. Many harmful vapors, gases and aerosols to chemical production

factors. The factor of biological production is presented in the form of microorganisms and products of their vital activity. The psychophysiological factor is divided into physical and neuropsychological. After work, the mental and emotional state of workers is negatively affected (Figure 1).

Any production must work according to norms and safety rules. In production, special clothing is used to prevent injury to people. Protective equipment for hands, feet, and eyes should be used [1].

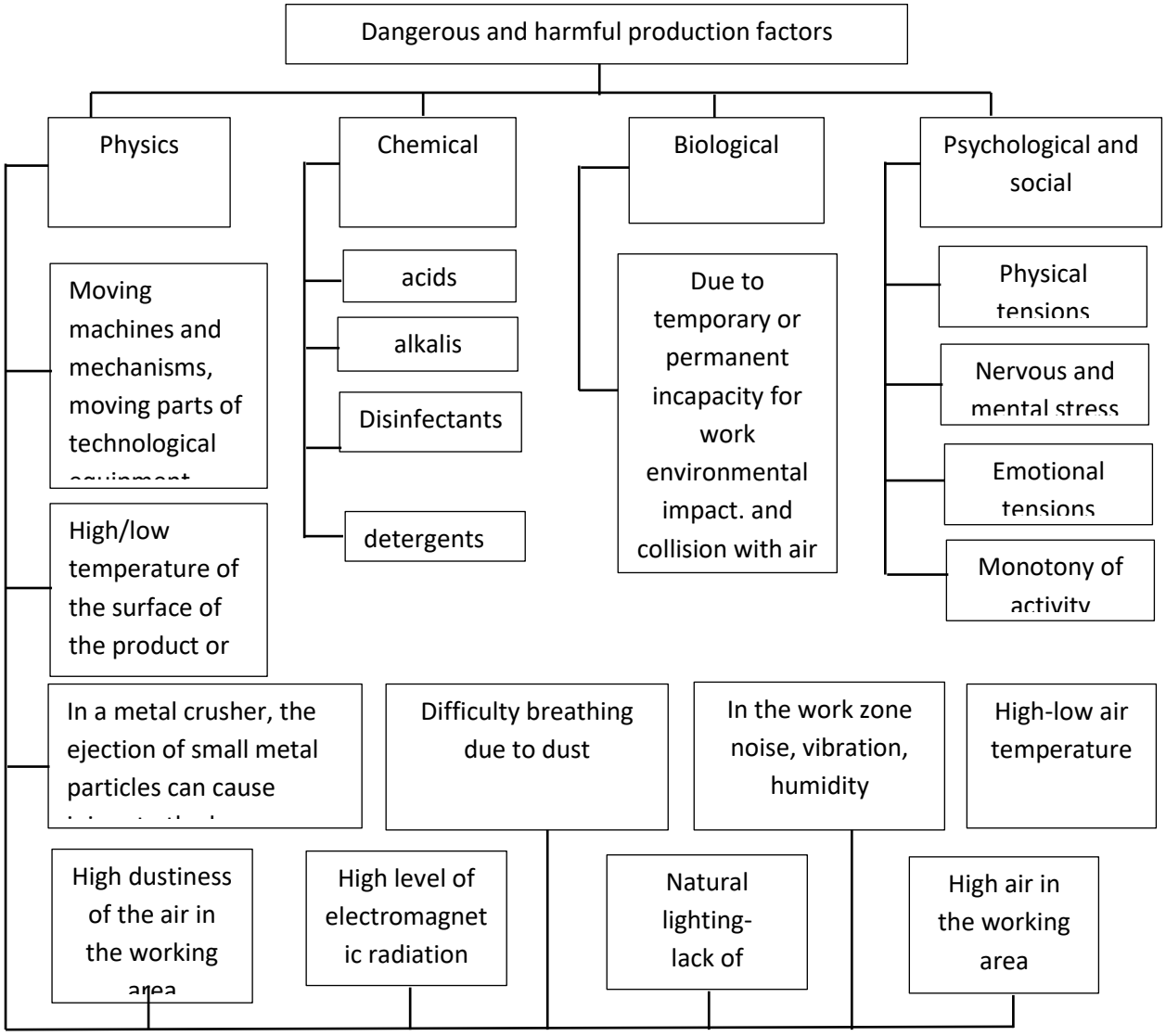

Fig-1. Classification of harmful and dangerous factors.

Analysis And Results. The main problem of ensuring the safety of workers in the mine is the presence of dangerous and harmful production factors that affect the human body - gas and dust of the atmosphere at the workplace, high temperatures, mechanical injuries to individual parts of the body, especially hands, feet, face, head. . For this reason, occupational diseases are observed in miners who have been working for a long time. It is divided into 4 classes according to the level of danger:

acceptable: they may have some deviations, but after rest, a person will recover;

harmful: when there is a deviation from any standards in production;

dangerous: threatens human life and health.

Labor protection regulations include: safety monitoring; training of employees; certification of workplaces; notification of protective measures; accident investigation; includes employee insurance. The Labor Code defines the rights of employees to work in a safe environment (Table 1).

According to the level of danger, the classes are divided into the following.

Table 1

Risk class	Features of work environment factors
Level 1 optimal working conditions	Hygiene requirements
Level 2 working conditions	It does not exceed the established hygiene standards and possible changes do not have a negative impact on the health of the worker.
Class 1 and 3 (3.1) working conditions	There are deviations that cause minor functional changes and increase the risk of health damage
Class 2 and 3 (3.2) working conditions	They lead to permanent functional changes, which lead to the appearance of initial symptoms or mild forms of an increase in occupational diseases.
Class 3 and 3 (3.3) working conditions	Development of mild and moderate occupational diseases and chronic (leading to professional growth)
Class 4 and 3 (3.4) working conditions	Under the influence of dangerous factors, severe forms of occupational diseases appear, a significant increase in chronic pathology and a high level of temporary morbidity are observed.
Level 4 - dangerous (extreme) working conditions	It is life-threatening, there is a high risk of severe or acute occupational injury.

Conclusion And Recommendations. Requirements for work clothes and personal protective equipment to increase personal protection safety of metallurgists. Requirements for miners' clothing are as follows:

social indicators: conformity of special-purpose goods to the requirements, competitiveness in the domestic and foreign markets, conformity of clothing to the consumer's requirements in terms of height and size assortment

indicators of hygienic suitability - should characterize their compliance with sanitary and hygiene norms and provide a comfortable microclimate under clothing;

aesthetic indicators - compatibility with modern style and fashion;

operational indicator - an indicator of the reliability of clothing during operation, shape retention, durability of details;

ergonomic indicators indicate the level of adaptation of the product to a person;

functional indicators include the suitability of clothing for the main function, size, age and fullness group characteristics of the consumer.

Special clothing collections are based on the multi-layer principle. Workers can independently combine wardrobe items depending on weather conditions. Work clothes for employees of metallurgical enterprises should be as comfortable as possible and should not restrict movement in any case. Special clothing for workers consists of jackets and pants, which are well-placed fasteners, pockets, as well as the choice of material to increase the comfort of the worker. In addition, protective safety shoes and gloves protecting hands from high temperatures, as well as head, face, vision and respiratory protection equipment, including: face shields, masks, goggles and respirators.

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UDC: 78.07

THE ROLE AND IMPORTANCE OF UZBEK FOLK MUSIC CREATIVITY IN THE EDUCATION OF YOUNG PEOPLE

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Annotation: in the article, teaching Uzbek folk music creativity and folk songs, in which teaching folk songs in the music lesson of general secondary schools as an urgent methodological problem, in the music lesson of general secondary schools, the essence and measures of ensuring succession in the teaching of Uzbek folk music creativity and folk songs, in the music lesson of general secondary

Keywords: Uzbek folk music creativity, folk songs, music, education, upbringing, Customs and rituals, traditionalism, material and spiritual cultural heritage.

Аннотация: В статье обучение узбекскому народному музыкальному творчеству и фольклорным песням, в которой рассматривается преподавание народных песен на уроках музыки в общеобразовательных школах как актуальная методическая проблема, сущность и меры обеспечения преемственности в обучении узбекскому народному музыкальному творчеству и фольклорным песням на уроках музыки в общеобразовательных школах, содержание и меры по обеспечению преемственности в обучении фольклорным песням на уроках музыки в общеобразовательных школах научно-теоретические рассуждения

Ключевые слова: узбекское народное музыкальное творчество, народные песни, музыка, образование, воспитание, традиции и обряды, традиция, материальный и духовный культурный обряд.

Annotatsiya maqolada o‘zbek xalq musiqa ijodiyoti va folklor qo‘shiqlarini o‘rgatish, unda umumiy o‘rta ta'lim maktablari musiqa darsida folklor qo‘shiqlarini o‘rgatish dolzarb metodik muammo sifatida, umumiy o‘rta ta'lim maktablari musiqa darsida O‘zbek xalq musiqa ijodiyoti hamda folklor qo‘shiqlarini o‘rgatishda vorisiylikni ta'minlashning mohiyati va o‘lchovlari, umumiy o‘rta ta'lim maktablari musiqa darsida folklor qo‘shiqlarini o‘rgatishning mavjud holati xususida ilmiy-nazariy fikr yuritildi

Kalit-so’zlar: o‘zbek xalq musiqa ijodiyoti, folklor qo‘shiqlar, musiqa, ta'lim, tarbiya, urf-odat va marosimlar, an'anaviylik, moddiy va ma’naviy madaniy maros.

Introduction: The President of our country, Sh.M. Mirziyoev, said, "We will mobilize all the strength and capabilities of our country and society so that our young people can become independent thinkers, have high intellectual and spiritual potential, become people who are not inferior to their peers in any field in the world, and become happy” quality and efficient organization of education, especially educating students from primary grades as independent thinkers, with high intellectual and spiritual potential, is one of the urgent issues of today. Our national-musical heritage, in particular, folk songs, plays a special role in educating the young generation based on the traditions, values and culture of our ancestors, and forming spiritual and moral qualities in them. After all, the Republican Center "Spirituality and Enlightenment" and the international funds "Golden Heritage" were established in order to renew our society spiritually and morally, restore our Eastern values, and give them a new spirit. At the same time, the president of the Republic of Uzbekistan dated May 31, 2017 “on measures for the further development and improvement of the field of Culture and art”dated May 3022- Decree No. 6000 of May 26, 2020 “on measures to further increase the role and influence of the field of Culture and art in the life of society”also mentions the implementation of large-scale work on raising the cultural level of young people, enjoying them the best examples of national and universal culture, on the basis of which large-scale work has been carried out, several tasks were set for the purpose of educating the younger generation in the spirit of national and universal values, kindness and loyalty to the native land.[1]

Methods: We are talking about the fact that “General secondary schools require teaching Uzbek folk music creativity and folk songs in music lesson, as an urgent methodical problem, General secondary schools of music the essence and measures of ensuring continuity in teaching Uzbek folk music creativity and folk songs, General secondary schools in music lesson the current state of teaching Uzbek folk music creativity songs The Uzbek folk musical heritage, a mirror of folk wisdom, with its educational capabilities, acquires special charm and impressiveness in comparison with other types of art. At each stage of its social, spiritual development, our people create a huge number of samples of songs, referring to its peat manifestations, Customs and rituals[2].This has shown a strong, artistic - emotional influence on the upbringing of people directly or indirectly, passing from generation to generation on the basis of tradition as an artistic aesthetic expression of various aspects of people's life, which from the distant past has become a culturally and educationally unique tradition[3]. It is evident that the views of our material and spiritual culture and art, created by the people and examples of folk creativity, reflect the worldview, the peculiarities of the lifestyle of the Uzbek people. From time immemorial, people also had a growing sense of the need to be influenced by the beauty of nature, colors and tones, to reflect their own feelings and thoughts in what was created by their own manual labor, to artistically describe the real world through the means of a subject. Thus, from the earliest times of the personality society, the earliest elements of aesthetic intuition began to be seen in the labor activity of a person. We see these aspects through examples of folk oral creativity, various manifestations of performance art, musical tones, dance movements and monuments of ancient applied art, which were created in the era of primitive society and have been polished for centuries and have reached US[4].

Results: The peculiarity of ancient family rituals and traditions, formed over thousands of years on the territory of our country, is primarily determined by the fact that this system of national values expresses a special identity that exists in each territory. In this respect, Uzbek folk family rituals are distinguished by their genre composition, the variety of Customs in it, the color of painting-painting and superstition. Our people, who have their own lifestyle and national traditions, have created samples of oral artistic creation from ancient times, consisting of a wide variety of genres. Thanks to the wide range of artistic talent and creative potential of our ancestors, a huge legacy has arisen that this invaluable range of values has served as one of the important factors that ensured the progress of our spirituality. In fact, the traditions of family ritual, formed directly in connection with the daily labor activity and life of the people, have steadily improved and evolved as a result of a consistent historical-folkloric and ethnographic process that spans long periods. The result is a type of professional performers who specialize in singing, telling one or another samples of folk art (for example, singing, epic, narration, fairy tale and other), performing[5]. In the process of improving the methods of artistic perception and interpretation of reality in folk art, the content of genres that differ from each other in the specificity of the vital-domestic function and scope, the possession of a certain poetic system, and the originality of the method of artistic expression has also constantly developed and improved. Especially important role in the historical development of folk art was played by the role and morality of Uzbek folk music creativity in the education of young people in the formation of diverse genres associated with traditions and rituals that express the national identity of our people. Because the family ceremony is characterized by the fact that, in addition to being an example of Intangible Cultural Heritage, benazir serves to cultivate the artistic and aesthetic taste of the younger generation and to ensure the spiritual unity of the nation. That is why the study of family ritual folklore, especially from the point of view of comparative-historical and areal folklore studies on the basis of materials of different regions of ritual songs and dances performed in a traditional way, which historically arose as a verbal component of Customs and painting-traditions, is important in determining the laws of the formation and After Uzbekistan gained national independence, the ancient and age-old values of the people were gradually restored, and many of them found their rightful place in the way of life of our people. In turn, some of the rituals brought under communist ideology during the Soviet era left the people's marriage, and in addition a new series of modern rituals entered. Folklore is an oral creation. At the initial stage of Uzbek folklore, the term “oral literature”was not in vain used in relation to folk oral creativity. One of the main features inherent in

folklore in UNG is that orality is taken as a basis, since folklore is first created orally, performed and lived orally. Folk poetic creativity arose before the emergence of writing. Its creation and distribution among men is associated with a lively oral tradition. The orality character distinguishes it from other types of folk art such as: Music, Dance, hook-carving. Oral creation and oral execution of folkloric works over the past centuries will not remain without affecting its form and content[6]. The role of Uzbek folk music creativity in the education of young people and the special role of the word art in achamism, in which the first examples of the word art began to appear with the emergence of human speech. A decisive place in its appearance is occupied by the conditions of that time, people's experiences of work and life, world views, traditions and rituals. The earliest prose works appeared. They are incredibly simple a get rid of which consists of exclamations and descriptions of events in different ways. That is, fairy tales and legends were created that relieve labor, refresh the soul, take it to the mindset[7]. Samples of songs that represented the labor process began to appear. A number of exclamations in the composition of folk songs, in particular in their traditional repetitions, can be taken directly as these ancient elements[8], [9].

Conclusion: As a conclusion, it is worth saying that the role and significance of Uzbek folk music creativity in youth education is special, and this requires more extensive topics, it is necessary to teach these songs and embellish them in the minds of young people, to sing the educational meanings of the song separately, to hear and teach ushun folk songs to them from preschool education. In Shu, we will achieve the upbringing of our youth as people loyal to their homeland.

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DEVELOPMENT OF OPTIMAL METHOD OF HARDWARE IMPLEMENTATION OF THE SM4 AND SM4_MIX ENCRYPTION ALGORITHMS

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Abstract: SM4 is extensively utilized in WLAN WAPI resource-constrained devices. This study introduces an 8-bit iteration structure for SM4 at an ultra-low cost, where key expansion and encryption alternate with only one S-Box. Additionally, to reduce area usage, an on-the-fly key expansion mechanism is employed to reserve memory for round keys, and constants keys are dynamically generated by an equation rather than being read from a large look-up table. The ASIC hardware implementation results indicate that our design has a gate count of only 2.47 K, achieving an approximately 16.0% reduction in area compared to recent works.

Keywords: SM4, dynamic key expansion, constant key, iteration structure

Аннотация: SM4 широко используется в устройствах с ограниченными ресурсами WLAN WAPI. В этом исследовании представлена 8-битная итерационная структура для SM4 со сверхнизкими затратами, в которой расширение ключа и шифрование чередуются только с одним S-Box. Кроме того, чтобы уменьшить использование области, используется механизм расширения ключей «на лету» для резервирования памяти для раундовых ключей, а ключи-константы динамически генерируются с помощью уравнения, а не считываются из большой справочной таблицы. Результаты аппаратной реализации ASIC показывают, что наша конструкция имеет количество вентилей всего 2,47 К, что обеспечивает уменьшение площади примерно на 16,0% по сравнению с недавними работами.

Ключевые слова: SM4, динамическое расширение ключа, постоянный ключ, итерационная структура.

Annatatsiya: SM4 WLAN WAPI resurslari cheklangan qurilmalarda keng qo'llaniladi. Ushbu tadqiqot SM4 uchun 8 bitli iteratsiya strukturasini juda arzon narxlarda taqdim etadi, bu erda kalitlarni kengaytirish va shifrlash faqat bitta S-Box bilan almashtiriladi. Bundan tashqari, maydondan foydalanishni kamaytirish uchun, dumaloq kalitlar uchun xotirani zaxiralash uchun tezkor kalitni kengaytirish mexanizmi qo'llaniladi va doimiy kalitlar katta qidirish jadvalidan o'qishdan ko'ra dinamik ravishda tenglama orqali hosil qilinadi. ASIC uskunasini amalga oshirish

natijalari shuni ko'rsatadiki, bizning dizaynimiz atigi 2,47 K eshiklar soniga ega va so'nggi ishlarga nisbatan maydonni taxminan 16,0% ga qisqartirgan.

Kalit so‘zlar: SM4, dinamik kalitni kengaytirish, doimiy kalit, iteratsiya tuzilishi

Introduction. SM4 is a block cipher designed to produce a 128-bit output from a 128-bit input and a 128-bit key through 32 non-linear rounds. Its structure is succinct, with each round involving a limited number of XOR operations, a non-linear substitution, and a linear substitution. Both encryption and decryption follow the same structure, with the only difference being the reversal of the round key order for decryption. The key expansion process shares a similar structure with encryption and utilizes the same non-linear substitution. This simplicity and similarity contribute to the ease of implementing SM4.

Several implementations of the SM4 algorithm exist, each optimized for specific purposes. One approach involves enhancing throughput through the use of pipeline structures. For instance, a swift implementation on smart cards partially unrolls the iteration loops from 32 rounds to 8 rounds [88]. Many works adopt a strategy of implementing key expansion and encryption separately to enhance parallelism and fully unroll 32 rounds [89–92]. This enables the simultaneous processing of 32 data blocks and the generation of a result every cycle. However, this high throughput is achieved by replicating S-Box and other logics, leading to substantial hardware resource consumption.

The alternative approach is to minimize hardware costs using iteration structures [90–93]. In this method, only one data block is processed at a time, and the output is produced after 32 clock cycles. Techniques such as employing small data width, reducing the number of S-Box instances, and implementing a lightweight key expansion mechanism have been proposed to create compact AES designs [94–96]. Given that AES is a representative block cipher, similar methods can be adapted for SM4. For instance, a design strategy involves sharing the iteration structure between key expansion and encryption, resulting in a halved number of S-Box instances [92]. An ultra-compact SM4 design, referred to as "UCSM4," employs an 8-bit iteration structure, utilizing a single S-Box through resource multiplexing and rescheduling constant keys [93]. The key expansion mechanisms can be categorized into two types: pre-computing and storing all round keys or providing round keys on-the-fly, known as on-the-fly key expansion [94]. The former is prevalent in previous works, including UCSM4, due to its high performance and low energy consumption when input keys remain constant. The latter performs key expansion for each data block but eliminates the need to store round keys, resulting in significant hardware resource savings. In the context of embedded systems, prioritizing low-cost considerations is crucial for designs on resource-restricted devices. However, previous works have achieved only limited reductions in hardware consumption, as low cost was not their primary focus. Our objective in this work is to minimize the area. In [97] proposes a new hardware implementation of SM4 at ultra-low cost (ULSM4). Like UCSM4, the iteration structure of ULSM4 takes 8-bit data width as process unit and supports the computation of key expansion and encryption. The main contribution is that we first utilized on-the-fly key expansion and generated constant keys dynamically by equation on 8-bit iteration structure of SM4, which minimizes the area.

This work introduces a novel hardware implementation of SM4, termed ultra-low-cost SM4 (ULSM4_2). Similar to UCSM4, the iteration structure of ULSM4 adopts an 8-bit data width as the process unit and facilitates key expansion and encryption computations. The primary innovation lies in the utilization of on-the-fly key expansion and dynamic generation of constant keys through equations on the 8-bit iteration structure of SM4, leading to significant area reduction. A comparison between ULSM4_2 and the latest work UCSM4 on the ASIC platform, based on logic synthesis results, reveals that ULSM4 occupies merely 2.51 K gates at SMIC18 technology, representing an 18.0% reduction compared to UCSM4. These area minimization methods demonstrate their effectiveness, positioning ULSM4 as a more suitable choice for resource-restricted devices.

Earlier studies on low-cost implementations of SM4 have demonstrated that employing a small-width processing unit and resource reutilization techniques can result in compact SM4 implementations. To further reduce hardware costs, ULSM4_2 utilizes an dynamic key expansion approach to reserve extensive memory for generated round keys. Additionally, 8-bit constant keys

are dynamically generated through an equation, eliminating the need for a large look-up table. As a result, ULSM4_2 is implemented at an ultra-low cost.

Methodology. The conventional SM4 algorithm is defined in 32 bits. In the subsequent sections, uppercase variables denote 32-bit vectors, while lowercase variables represent 8-bit vectors. Table 3.4 provides definitions for certain terminologies.

Table 3.4.

Main transformations used in the SM4 algorithm transformation

Symbol	*Description*
S ()	Substitution box with 8-bit data width
$\oplus$	Bitwise XOR
<<< n	Circular shift left of a 32-bit vector by n bits

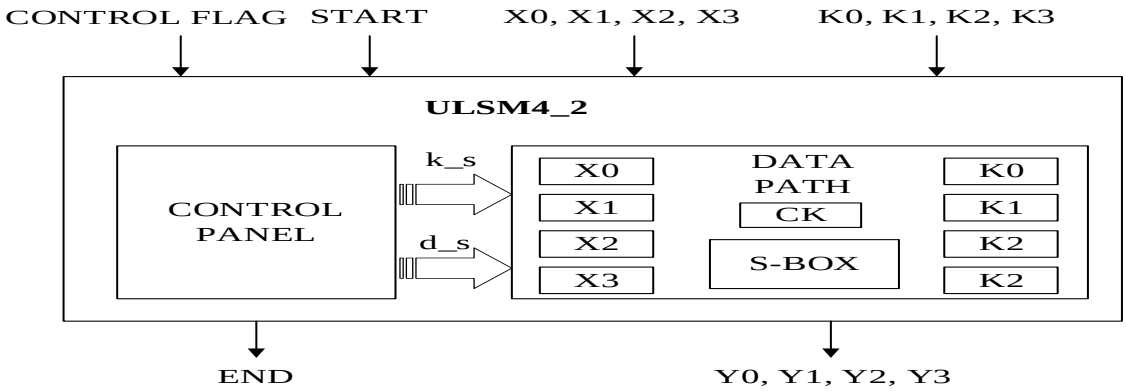

Figure 3.2. Block diagram of ULSM4_2

The proposed design facilitates both encryption and decryption in Electric Code Block (ECB) mode, as depicted in Figure 3.2. Input interfaces X0, X1, X2, X3 and K0, K1, K2, K3 represent data and key, respectively, while Y0, Y1, Y2, Y3 serve as the output interface for data. The bus width for both input and output interfaces is 8 bits. The start signal activates computation, and the control flag determines whether encryption or decryption should be performed. Upon the high signal of "done," the results are returned through the output interface. ULSM4_2 comprises a control module and a data path module. The control module manages the scheduling of the data path module for key expansion or encryption, maintaining register updates through signals k_s and d_s. The data path module updates 8 bits at a time and requires four cycles for one round of functions F and F'. With on-the-fly key expansion and a shared iteration structure for key expansion and encryption, the data path module includes two 128-bit register sets for storing intermediate data: XR = {XR0, XR1, XR2, XR3} for encryption and KR = {KR0, KR1, KR2, KR3} for key expansion.

ULSM4_2 employs a mechanism for on-the-fly key expansion, generating round keys dynamically. As key expansion is necessary even when the input keys remain constant, ULSM4_2 integrates key expansion with the encryption/decryption process. In encryption, the procedure involves 32 iterations, encompassing one round for key expansion and one round for encryption. To ensure the round key is prepared for the encryption round within the same iteration, the key expansion round is executed first. The KR and XR registers store intermediate results and are updated upon completion of the corresponding round. The encryption process is outlined in Algorithm 1.

Algorithm 1: On-the-fly Key Expansion for Encryption process

Input: Plain text (X_0, X_1, X_2, X_3) and Key (K_0, K_1, K_2, K_3)
Output: Cipher text (Y_0, Y_1, Y_2, Y_3)
1 *(KR0, KR1, KR2, KR3)= (K_0, K_1, K_2, K_3);*
2 *(XR0, XR1, XR2, XR3) = (X_0, X_1, X_2, X_3);*
3 ***for** i=0 **to** 31 **do***
4 *RK_i=F`(KR0, KR1, KR2, KR3, CK_i);*
5 *(KR0, KR1, KR2, KR3)=(KR1, KR2, KR3, RK_i);*
6 *RX_i=F`(XR0, XR1, XR2, XR3, KR3);*

7 *(XR0, XR1, XR2, XR3)=(XR1, XR2, XR3, RX_i);*
8 *(Y_0, Y_1, Y_2, Y_3) = (XR3, XR2, XR1, XR0);*
9 ***return*** *(Y_0, Y_1, Y_2, Y_3);*

For decryption, the ordering of round keys is reversed. On-the-fly key expansion for decryption involves three steps. In the first step, the final round key is obtained by solely performing key expansion. The second step entails reversing the KR register to ensure the correct key order. Finally, the key expansion and decryption are combined into a single process. This process comprises 32 iterations, with the round count decreasing from 31 to 0. Unlike encryption, in decryption, the round for decryption is executed first, and the round for key expansion generates the round key for the subsequent iteration. In the last four iterations, the round keys are already available in the KR registers, and a shift left operation is sufficient to retrieve them, thus the round for key expansion is omitted. The decryption process is outlined in Algorithm 2.

Algorithm 2: On-the-fly Key Expansion for Decryption process

Input: Cipher text (Y_0, Y_1, Y_2, Y_3) and Key (K_0, K_1, K_2, K_3)
Output: Plain text (X_0, X_1, X_2, X_3)
1 *(KR0, KR1, KR2, KR3)= (K_0, K_1, K_2, K_3);*
2 *(XR0, XR1, XR2, XR3) = (Y_0, Y_1, Y_2, Y_3)*
3 ***for*** *i=0* ***to*** *31* ***do***
4 *RK_i=F`(KR0, KR1, KR2, KR3, CK_i);*
5 *(KR0, KR1, KR2, KR3)=(KR1, KR2, KR3, RK_i);*
(KR0, KR1, KR2, KR3)=(KR3, KR2, KR1, KR0);
for *i=0* ***to*** *31* ***do***
6 *RX_i=F`(XR0, XR1, XR2, XR3, KR0);*
7 *(XR0, XR1, XR2, XR3)=(XR1, XR2, XR3, RX_i);*
if *i >= 4* ***then***
RK_{i-4}=F`(KR0, KR1, KR2, KR3, CK_i);
(KR0, KR1, KR2, KR3)=(KR1, KR2, KR3, RK_{i-4});
else
(KR0, KR1, KR2, KR3)=(KR1, KR2, KR3, 0);
8 *(X_0, X_1, X_2, X_3) = (XR3, XR2, XR1, XR0);*
9 ***return*** *(X_0, X_1, X_2, X_3);*

Hence, the on-the-fly key expansion mechanism utilizes only 128-bit registers to produce the round keys, eliminating the need to store all round keys in a 32x32-bit memory and significantly conserving hardware resources.

The iteration structure of ULSM4_2 is illustrated in Figure 2. This architecture is 8-bit, with the exception of the linear substitution, which involves a 32-bit circular shift left and cannot be broken down into byte operations. XR and KR registers function as shift registers, shifting 8 bits to the left per clock cycle.

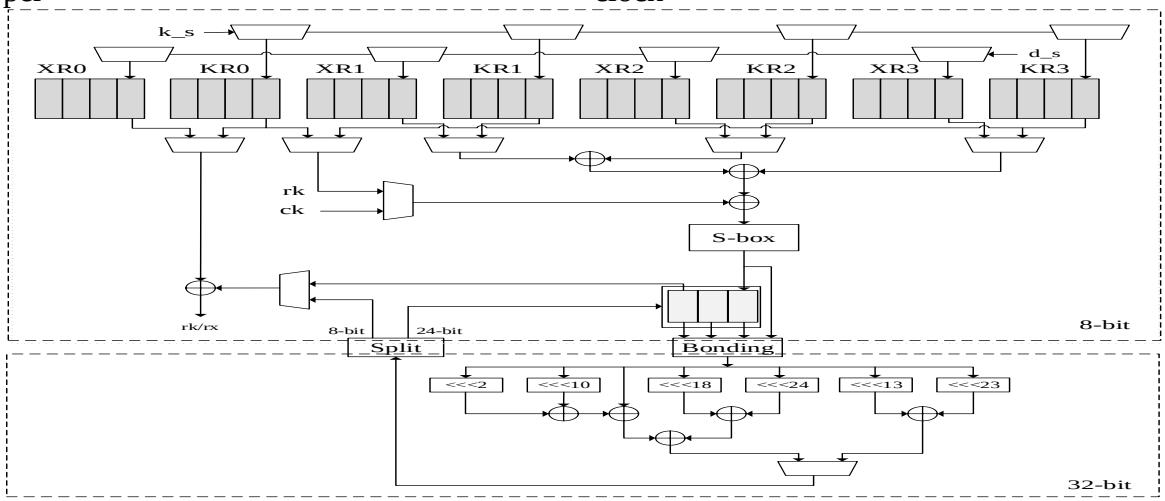

Figure3.3. Iteration structure of ULSM4_2

Only the rightmost byte updates through an 8-bit multiplexer controlled by d_s or k_s and is selected for 8-bit XOR operations. Register BR serves as a shift left register, storing the output of the S-Box in the first three cycles of a round and is repurposed to store the lower 24 bits of the linear substitution's output in the last cycle. The output interface is 8-bit, and the results require four cycles to return. For encryption, the round key rk is derived from register KR3, whereas for decryption, it is sourced from register KR0.

When the iteration structure is designated for key expansion, constant keys become necessary. In previous approaches, these constant keys were implemented using a lookup table (LUT) with a size of 32x32 bits, which was deemed too resource-intensive. In our design, we opt to dynamically generate the constant keys through an equation, and only one equation is implemented due to the 8-bit process unit. The equation in hardware implementation is:

$$c^{k,j} = (4 * i + j) * 7 \; mod \; 256 = \big((4 * i) \lll 3 - 4 * i - j\big) \; mod \; 256$$

Where $i = 0,1,2, \dots ,31$ represents the round count, and $j = 0,1,2,4$ is the cycle count in a round.

The addition and shift left operations in the equation can be circumvented by direct wiring, necessitating only one subtraction.

Results. We implemented ULSM4_2 on an ASIC platform and conducted logic synthesis for a typical case using Synopsys Design Compiler. The frequency in the synthesis script is configured to 185 MHz, considering UCSM4 [93] as the baseline.

UCSM4 features an 8-bit iteration structure with a single S-Box shared for key expansion and encryption. The round keys are pre-computed and stored in memory, and constant keys are implemented using a Look-Up Table (LUT). An additional design, named OTFSM4, is implemented based on UCSM4, applying on-the-fly key expansion. In OTFSM4, constant keys are also implemented using LUT, but they are not rescheduled. Therefore, the key expansion mechanism is the primary distinction between UCSM4 and OTFSM4. The synthesis results are presented in Table3.4.

Table 3.4.

Synthesis outcomes for logic @ SMIC18 and 185 MHz

Item	Area/ μm²			Gate count
	Combinational	Non-combinational	Total	
UCSM4 [93]	19,772	10,797	30,569	3060
OTFSM4 [97]	11,794	13,513	25,308	2530
ULSM4 [97]	11,557	13,496	25,053	2510
OTFSM4_2 [this work]	11,744	13,484	25,228	2490
ULSM4_2 [this work]	11,512	13,444	24,956	2470
SM4_Mix	15,494	16,744	32,238	2840
SM4_Mix (with Lut_table)	12,356	14,452	26,808	2560

In OTFSM4_2, the overall area is 25,228 μm², comprising 11,744 μm² for combinational logics and 13,484 μm² for non-combinational logics. UCSM4 serializes key expansion and encryption, while OTFSM4_2 processes them sequentially. Consequently, OTFSM4_2 has 256 bits of registers for immediate results, compared to the baseline's 128 bits. This difference explains why the non-combinational logics area in OTFSM4 exceeds that of UCSM4. However, the on-the-fly key expansion approach in OTFSM4 reduces the memory requirement for round keys, resulting in a smaller area for combinational logics. The hardware footprint of OTFSM4_2 is 64.4 % of that of UCSM4.

The primary distinction between OTFSM4 and ULSM4_2 lies in the generation of constant keys. In ULSM4_2, constant keys are produced through an equation. This alteration does not impact

the non-combinational logic area significantly in ULSM4_2, which remains nearly the same as in OTFSM4. However, the combinational logic area in ULSM4_2 decreases from 11,512 μm² to 11,444 μm². The equation for generating an 8-bit constant key involves an 8-bit subtraction, whereas a 32x32-bit LUT, used in OTFSM4, requires numerous multiplexers to select the 8-bit constant key. Therefore, employing an equation for 8-bit constant key generation proves to be more hardware-efficient. The total area of ULSM4_2 is 24,956 μm², representing a 1.0% reduction compared to OTFSM4_2 and an 16.0% decrease compared to UCSM4. This outcome demonstrates that ULSM4_2 exhibits a more frugal utilization of hardware resources.

In SM4_Mix, the overall area is 32,238 μm², comprising 15,494 μm² for combinational logics and 16,744 μm² for non-combinational logics. In SM4_Mix (with Lut_table), the overall area is 26,808 μm², comprising 12,356 μm² for combinational logics and 14,452 μm² for non-combinational logics.

Table 3.5.

Comparison of throughput

Item	Mode	Key	Cycles	Frequency/MHz	Throughput/Mbps
UCSM4 [93]	Encryption	Changed	256	185	92.5
	Decryption	Changed	256	185	92.5
	Encryption	Unchanged	128	185	185
	Decryption	Unchanged	128	185	185
ULSM4 [97]	Encryption	Not care	256	435	217.5
	Decryption	Not care	372	435	149.7
ULSM4_2 [this work]	Encryption	Not care	256	435	225.4
	Decryption	Not care	372	435	162.5
SM4_Mix	Encryption	Not care	288	480	204.5
	Decryption	Not care	404	480	134.7
SM4_Mix (with Lut_table)	Encryption	Not care	256	435	225.4
	Decryption	Not care	372	435	162.5

Discussion. We also conducted a comparison of ULSM4_2's throughput with UCSM4, SM4_Mix and SM4_Mix (with Lut_table) and the results are presented in Table 3.5. Throughput is determined by the maximum frequency and the number of cycles required to complete the SM4 algorithm. Since the memory for storing all round keys is on the critical path, the maximum frequency of UCSM4 is constrained to 185 MHz UCSM4 requires 256 cycles to complete encryption or decryption when the input keys are altered and 128 cycles when the input keys remain unchanged. Consequently, the maximum throughput of UCSM4 is 185 MHz.

In contrast, ULSM4_2 boasts a superior maximum frequency of 435 MHz, independent of the state of input keys. It necessitates 256 cycles to finalize an encryption and 372 cycles to complete a decryption. This results in a throughput of 225.4 Mbps for encryption and 162.5 Mbps for decryption. Therefore, ULSM4_2 exhibits a higher maximum throughput compared to UCSM4.

Conclusion. In this article, we introduced ULSM4_2, an iteration structure designed for SM4 with a focus on cost-effectiveness. To fully leverage hardware resources and streamline logic complexity, ULSM4_2 adopts an 8-bit data width as the process unit, featuring a single S-Box shared for both key expansion and encryption. To minimize the area, we implemented on-the-fly key expansion, reserving memory for generated round keys, and employed a dynamic equation to generate 8-bit constant keys. Synthesis results indicate that ULSM4_2 reduces the area by 16.0% compared to the latest UCSM4 approach (15.1% reduction for on-the-fly key expansion and 0.9% for generating constant keys by equation). Thus, ULSM4_2 demonstrates enhanced efficiency in resource utilization, making it well-suited for providing data protection in resource-restricted applications.

In contrast, SM4_Mix boasts a superior maximum frequency of 480 MHz, independent of the state of input keys. It necessitates 288 cycles to finalize an encryption and 404 cycles to complete a decryption. This results in a throughput of 204.5 Mbps for encryption and 134.7 Mbps for decryption.

Therefore, SM4_Mix (with Lut_table) exhibits a higher maximum throughput (225.4 Mbps for encryption and 162.5 Mbps for decryption) compared to SM4_Mix.

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UDK: 004.056.55

ALGEBRAIC CRYPTANALYSIS OF THE SM4 SYMMETRIC BLOCK CIPHER ALGORITHM

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Abstract. In this paper, the Chinese block cipher algorithm SM4 is evaluated as a algebraic cryptanalysis method. As a result of the analysis, it was found that 12519 equations with 2^{36} unknowns for 21 rounds of SM4 algorithm. And solve complexity of system of these equations is equivalent to 2^{108}.

Keywords: information security, cryptographic, algebraic attack, relinearization, plaintext, ciphertext, transformation, substitution, S-box

Аннотация. В данной статье оценивается китайский алгоритм блочного шифрования SM4 с помощью метода алгебраического криптоанализа. В результате анализа было установлено, что для 21 раунд алгоритма SM4 имеется 12519 уравнений с 2^{36} неизвестными. А сложность решения этой системы уравнений равна 2^{108}.

Ключевые слова: информационная безопасность, криптография, алгебраическая атака, релинеаризация, открытый текст, шифр текст, преобразование, перестановка, S-блок

Annotatsiya. Ushbu maqolada Xitoy blokli shifrlash algoritmi SM4 algebraik kriptoanaliz usuli sifatida baholangan. Tahlil natijasida SM4 algoritmining 21 ta davrasi uchun 2^{36} ta noma'lumli 12519 ta tenglama mavjudligi aniqlandi. Va bu tenglamalar tizimini yechish murakkabligi 2^{108} ga teng.

Kalit so'zlar: axborot xavfsizligi, kriptografiya, algebraik hujum, chiziqlilashtirish, ochiq matn, shifr matn, transformatsiya, almashtirish, S-box

Introduction. In the field of information security, a crucial task involves evaluating the robustness of security methods designed to safeguard confidential information. Modern information security systems heavily rely on cryptographic methods, where the reliability of algorithms serves as a key factor in ensuring the confidentiality of data. Assessing the reliability of cryptographic algorithms constitutes a complex mathematical challenge, necessitating the development of computationally efficient algorithms, intricate models, and methods for conducting evaluations of experimental results. Notably, algebraic analysis methods are actively evolving and being refined, particularly in the context of cryptographic algorithms, with a special emphasis on lightweight algorithms due to their simplified mathematical structures. The significant increase in computational power and the optimization of algorithms for tackling computationally challenging problems underscore the growing importance of both theoretical and experimental research on the reliability of cryptographic tools and algorithms for information protection.

Evaluating information security often involves the exploration of solutions to systems of Boolean nonlinear equations and the analysis of the complexity of various methods used to solve these equations in numerous information security systems. For instance, the representation of the following information security processes can be expressed in the form of systems of Boolean nonlinear equations:

- reviewing the present condition of the protected entity;
- verifying the functionality of programs;
- assessing the reliability of systems for safeguarding confidential information (which includes cryptographic transformations).

One facet of studying the reliability of ciphers involves evaluating the suitability of algebraic analysis methods. Presently, researchers have introduced various techniques for algebraic analysis, particularly in solving systems of Boolean nonlinear equations. For instance:

reduction to linear systems (relinearization) [1];
extended linearization (eXtended Linearization) [2];
extended sparse linearization (eXtended Sparse Linearization) [3];
algorithms F4, F5 [4, 5];
Raddum-Semaev algorithm [6];
ElimLin [7];
SAT solving [8-12].

Application SAT-solving-based algebraic analysis for symmetric block ciphers.

Evaluating the robustness of symmetric block encryption algorithms through reduction to the SAT problem involves the following key stages:

1. Selecting a method and constructing a system of Boolean nonlinear equations to establish connections between the provided data (plaintext/ciphertext) and the encryption key (round keys). To create such systems for observed block ciphers, the suggestion is to employ bit nonlinear cipher transformations, including substitution boxes and modulo 2^n addition operations;
2. Creating a subsystem of Boolean nonlinear equations that characterizes the algorithm for generating round encryption keys (optional; this step is employed if the encryption scheme includes this procedure);
3. Assessing the effectiveness of the selected method for solving the generated system of Boolean nonlinear equations. The suggested approach involves utilizing reduction to the SAT problem and applying the SAT solver CryptoMiniSat [13];
4. Exploring solution sets (identifying the encryption key). The proposal involves utilizing the open-source mathematics software system SageMath [14];
5. Assessing the computational complexity of reliability analysis for encryption algorithms based on the number of rounds analyzed and the configuration of substitution boxes;
6. Evaluating the time complexity of reliability analysis based on the parameters of the computing system, such as processor frequency, RAM, the number of processors engaged in the calculations, etc;

7. Establishing criteria and principles for shaping the ultimate evaluation of the cipher's strength concerning SAT problem reduction methods.

The initial data for the method include:

- The architecture of the scrutinized encryption algorithm designed for safeguarding confidential information;
- Configuration of substitution transformations within the examined encryption algorithm;
- Sets of text pairs: plaintext and corresponding ciphertext.

The outcomes of the method encompass:

- The determined value of the encryption key (or multiple values);
- Characteristics of the Boolean nonlinear equation system describing the scrutinized encryption transformation: including the count of equations, unknowns, and monomials;
- Computational complexity involved in solving the system of Boolean nonlinear equations;
- Time complexity associated with solving the system of Boolean nonlinear equations;
- The quantity of known text pairs that enable the unambiguous determination of the encryption key in real-time;
- The necessary amount of RAM for executing computations.

Main part. The SM4 cipher [15] is a block iterative encryption algorithm adopted as the Chinese national standard for wireless local networks. The SM4 cipher operates on 128-bit blocks with a 128-bit secret key and employs iterative transformations across 32 rounds. The transformations employed in the SM4 cipher include four parallel 8-bit substitution boxes, addition modulo 2, and cyclic shifts by 2, 10, 18, and 24 positions. Figure 1 illustrates one round of encryption in the SM4 algorithm.

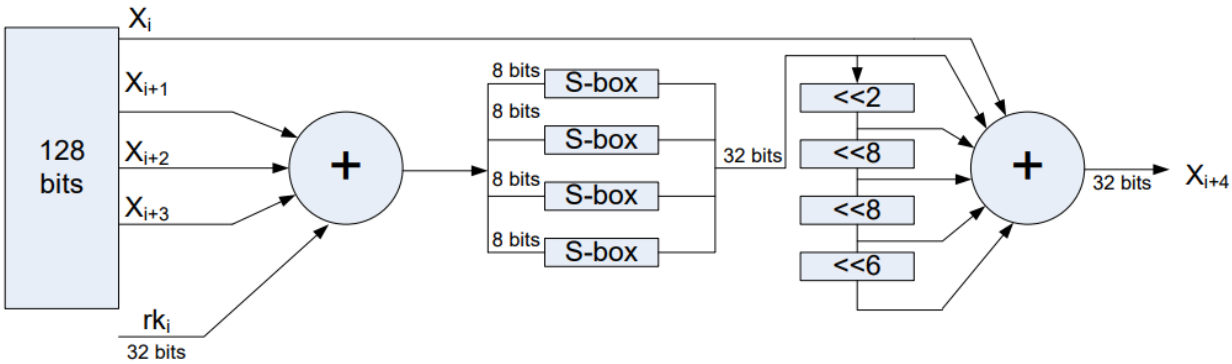

Figure 1. Scheme of one round of encryption in the SM4 algorithm

In the algebraic analysis modeling of the SM4 cipher, it is important to highlight that the primary transformation employed to construct the system of equations is a nonlinear substitution within the S-boxes. Let's consider an $s \times s$-bit S-box. Represent the total number of compositions of input and output block bits as t. Consequently, there are at least $t - 2^s$ linearly independent equations that are valid with a probability of 1.

As an example, the Boolean nonlinear equations for an $s \times s$-bit S-box are defined as follows (Equation 1):

$$\sum_{i,j,k=0}^{s-1} \alpha x_i y_j y_k + \sum_{i,j,k=0}^{s-1} \beta x_i x_j y_k + \sum_{i,j=0}^{s-1} \gamma x_i y_j + \sum_{i,j=0}^{s-1} \delta y_i y_j + \sum_{i=0}^{3} \lambda x_i + \sum_{i=0}^{3} \omega y_i + \eta = 0 \quad (1)$$

where each of $\alpha, \beta, \gamma, \delta, \lambda, \omega, \eta$ are binary coefficients;

x_i and y_i correspond to the i-th bit of the input and output vectors of the S-box, respectively.

s represents the length of the input and output vectors.

The formula (2) is utilized to compute the number of possible monomials with a degree of 3 or less:

$$t = \binom{2s}{3} + \binom{2s}{2} + 2s + 1 \quad (2)$$

In the case of the SM4 cipher with an 8 × 8-bit S-box, the total number of monomials, denoted as t, is obtained as follows:

$$t = \binom{16}{3} + \binom{16}{2} + 16 + 1 = 697$$

Consequently, it is feasible to identify $r \geq t - 2^8 = 441$ linearly independent cubic equations. The system of degree 3 Boolean equations for the SM4 substitution box comprises the equations outlined in Figure 2.

x3y0+x2y7+x2y1+x1y7+x1y3+x1y2+x1y1+x1y0+y6+y5+y4+y3+y2+y1+y7+y3+y1+y0+x7x6x5+x7x6x3+x7x6x2+x7x6x1+x7x6+x7x5x4+x7x5x3+x7x5x2+x7x5+x7x4x1+x7x4x0+x7x4+x7x3x0+x7x2x1+x7x2+x7x1+x7x0+x7+x6x5x4+x6x5x3+x6x5x2+x6x5+x6x4x2+x6x4x1+x6x4+x6x1x0+x6x1+x6x0+x6+x5x4x0+x5x3+x5x2x1+x5x2x0+x5x2+x5x1+x5x0+x5+x4x3x2+x4x3+x4x1x0+x3x2x0+x3x1x0+x2x1x0+x2+x1x0+x0=0

x3y2+x3y1+x2y7+x2y6+x2y5+x2y4+x2y3+x2y1+x2y0+x1y5+x1y4+x1y2+y6+y5+y1+y0+x7x6x4+x7x5x4+x7x5x3+x7x4x1+x7x4x0+x7x3+x7x2x0+x7x1x0+x7x1+x7+x6x5x4+x6x5x2+x6x5x0+x6x5+x6x4x3+x6x4x2+x6x4x0+x6x3x0+x6x3+x6x2x1+x6x1x0+x6x1+x6+x5x4x3+x5x4x2+x5x4x1+x5x4x0+x5x3x2+x5x3+x5x2x0+x5x2+x4x3x0+x4x2x0+x4x1x0+x4x1+x4x0+x4=0

x3y3+x3y1+x2y3+x2y2+x1y7+x1y6+x1y4+x1y3+x1y0+y5+y7+y5+y4+y3+y2+y1+y0+x7x6x5+x7x6x3+x7x6x2+x7x6x1+x7x6x0+x7x6+x7x5x4+x7x5x3+x7x5x2+x7x5x1+x7x5x0+x7x5+x7x4x3+x7x4x2+x7x4+x7x3x0+x7x3+x7x2x0+x7x2+x7x1x0+x7x1+x7x0+x6x5x0+x6x5+x6x4x3+x6x4x1+x6x4+x6x3x2+x6x3x0+x6x2x1+x6x2x0+x6x1+x6x0+x6+x5x4x3+x5x4x2+x5x4x1+x5x4x0+x5x3x2+x5x3x0+x5x2x0+x5x2+x5x1x0+x5x1+x5+x4x2+x4x1x0+x4+x3x2x1+x3x1x0+x3x1+x2x1x0+x1x0+x1=0

…..

Figure 2. Degree 3 boolean equation system for SM4 substitution box.

The SM4 cipher's S-box transformation is expressed through 441 linearly independent equations, featuring a total number of monomials not exceeding 697. One round of the SM4 encryption algorithm, considering that the only nonlinear operation is substitution in S-boxes, and other transformations result in bit permutations, can be delineated as a system of 1764 cubic linearly independent equations with 64 unknowns (round key rk and S-boxes output vector). For the full-round version of SM4 (32 rounds), a set of 56448 cubic equations with 2048 unknowns was formulated (32 rk_i and 32 S-boxes output vector).

Methodology

Following the creation of the system of Boolean nonlinear equations, we replace the input and output vectors of the S-box with known text pairs (plaintexts and ciphertexts) using our understanding of the encryption algorithm's structure (The known data employed for substitution is illustrated in Figure 3):

$$Input\ S = Pt_{i+1} \oplus Pt_{i+2} \oplus Pt_{i+3} \oplus rk,$$
$$Output\ S = Pt_i \oplus Y_{\ll 2} \oplus Y_{\ll 10} \oplus Y_{\ll 18} \oplus Y_{\ll 24} \oplus Ct, \quad (4)$$

In this equation:

- $Input\ S$ represents the concatenation of the input vectors of 4 S-boxes.
- $Output\ S$ represents the concatenation of the output vectors of 4 S-boxes.
- Pt stands for plaintext.
- Ct stands for ciphertext.
- rk denotes the secret round key.
- i signifies the index of the current block, ranging from 0 to 4.

At this phase, a system of boolean equations, presented in algebraic normal form (ANF), is established. To utilize existing SAT-solvers, it is necessary to convert the formed system of Boolean equations (in ANF) into conjunctive normal form (CNF). For the representation of the resulting system in CNF, the anf2cnf conversion library [16-18] is employed. Let's consider an example of converting an arbitrary system of Boolean equations into CNF, given in the form [18]:

$$a \cdot b \oplus b \cdot c \oplus b \oplus d = 0,$$
$$b \cdot c \oplus c \oplus a = 0, \quad (5)$$

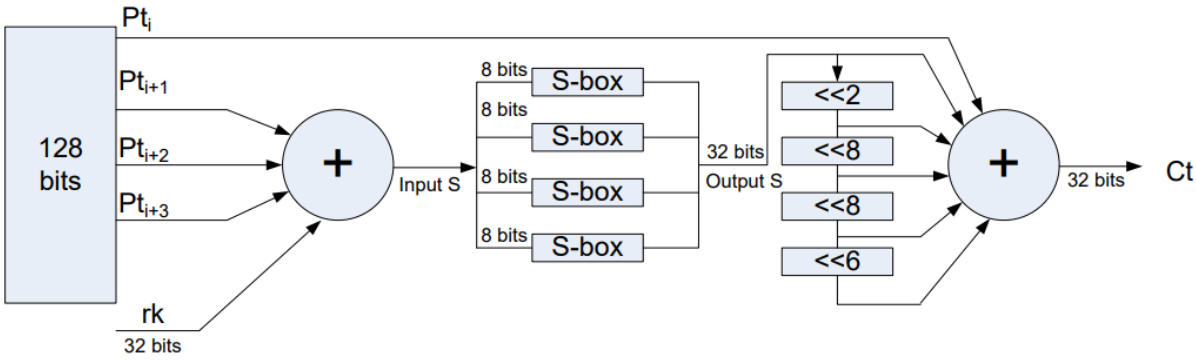

Figure 3. The structure illustrating the relationships between the SM4 cipher's plaintext/ciphertext and the input/output bits of S-boxes.

In this context, $'a', 'b', 'c', and\ 'd'$ represent binary unknowns. The symbol "⊕" denotes the addition operation modulo two (XOR), and "·" represents the bitwise multiplication operation (AND).

By following the described algorithm, the system of equations is transformed into a linear form through the introduction of additional unknowns z_1 and z_2:

$$z_1 = a \cdot b,$$
$$z_2 = b \cdot c,$$
$$z_1 \oplus z_2 \oplus b \oplus d = 0,$$
$$z_2 \oplus c \oplus a = 0.$$

We express each equation of the transformed system in Conjunctive Normal Form (CNF):

The expression $z_1 = a \cdot b$ is presented as:

$$z_1 \vee \bar{a} \vee \bar{b} = 1, z_1 \vee a = 1, z_1 \vee b = 1.$$

The expression $z_2 = b \cdot c$ is presented as:

$$z_2 \vee \bar{b} \vee \bar{c} = 1, z_2 \vee b = 1, z_2 \vee c = 1.$$

The expression $z_1 \oplus z_2 \oplus b \oplus d = 0$ is presented as:

$\bar{z_1} \vee z_2 \vee b \vee d = 1, z_1 \vee \bar{z_2} \vee b \vee d = 1, z_1 \vee z_2 \vee \bar{b} \vee d = 1, z_1 \vee z_2 \vee b \vee \bar{d} = 1, z_1 \vee z_2 \vee \bar{b} \vee d = 1, z_1 \vee z_2 \vee b \vee \bar{d} = 1, z_1 \vee z_2 \vee \bar{b} \vee \bar{d} = 1, z_1 \vee z_2 \vee \bar{b} \vee \bar{d} = 1.$

The expression $z_2 \oplus c \oplus a$ is presented as:

$$z_2 \vee c \vee \bar{a} = 1, z_2 \vee \bar{c} \vee a = 1, \bar{z_2} \vee c \vee a = 1, \bar{z_2} \vee \bar{c} \vee \bar{a} = 1.$$

Subsequently, the system of equations in CNF is resolved using the SAT-solver algorithm. We opted to employ the CryptoMiniSat SAT-solver for tackling the cryptographic task. The experiment was conducted within the SageMath environment [14], utilizing the built-in CryptoMiniSat SAT-solver.

Results. The entire duration to solve the Boolean nonlinear system of a one-round SM4 cipher using the SAT-solver CryptoMiniSat within the SageMath environment amounted to 31.54 seconds on a PC with an 11th Gen Intel(R) Core(TM) i7-1165G7 processor running at 2.80 GHz and 16 GB of RAM.

It is also possible to form a degree 2 system of equations for the S-box substitution table of the SM4 encryption algorithm. Degree 2 Boolean equations for the SM4 substitution box comprises the equations outlined in Figure 3. The number of degree 2 linearly independent equations in the equation system is 39 with 64 unknowns. The entire duration to solve the degree 2 boolean nonlinear system of a one-round SM4 cipher using the SAT-solver CryptoMiniSat within the SageMath environment amounted to 17.41 seconds on a PC with an 11th Gen Intel(R) Core(TM) i7-1165G7

processor running at 2.80 GHz and 16 GB of RAM.

x4y0+x3y6+x3y2+x3y0+x2y6+x2y4+x2y3+x2y0+x1y7+x1y5+x1y4+x1y3+x1y0+y7+y5+y4+y3+y2+y0
+y6+y5+x7x6+x7x5+x7x4+x7x3+x7x2+x7x1+x6x4+x6x2+x6x1+x5x4+x5x3+x5x2+x5x1+x4x2+x4x0+
x4+x3x2+x3x1+x3x0+x2x0+x2=0

x4y1+x3y4+x3y2+x3y1+x2y5+x2y4+x2y3+x2y1+x2y0+x1y7+x1y5+x1y2+x1y1+y6+y4+y3+y1+y6+y3
+x7x6+x7x5+x7x2+x7x1+x6x5+x6x2+x5x4+x5+x4x0+x4+x3x1+x3x0+x2x1+x2x0+x1x0+x0=0

x4y2+x3y5+x3y4+x3y2+x3y0+x2y7+x2y6+x2y5+x2y4+x2y3+x2y2+x2y1+x2y0+x1y4+x1y3+x1y2+x1y
0+y4+y3+y2+x7x4+x7x2+x7x1+x7x0+x7+x6x5+x6x4+x6x3+x6x1+x6+x5x4+x5x0+x4x2+x2x0+x2+x1
x0=0

x4y4+x4y3+x3y1+x2y7+x2y4+x2y2+x2y1+x1y6+x1y5+x1y3+x1y1+x1y0+y7+y5+y3+y2+y6+y5+y4+y
2+y0+x7x5+x7x4+x7x2+x6x5+x6x4+x6x3+x6x0+x5x3+x5x1+x5+x4x0+x3x1+x2x0=0

x4y5+x4y3+x3y7+x3y1+x3y0+x2y7+x2y5+x2y4+x2y3+x2y1+x2y0+x1y7+x1y5+x1y4+x1y3+x1y2+x1y
0+y7+y6+y5+y4+y2+y0+y5+y3+y2+y1+x7x4+x7x0+x7+x6x5+x6x3+x6x1+x6x0+x6+x5x4+x5x2+x5x1
+x5+x4x3+x4x1+x4x0+x4+x3x1+x3x0+x3+x2+x1=0

x4y6+x3y6+x3y5+x3y4+x3y2+x3y1+x2y7+x2y4+x2y2+x2y1+x2y0+x1y6+x1y5+x1y4+x1y3+x1y1+y6
+y2+y1+y7+y3+y1+x7x5+x7x4+x7x2+x7x1+x7x0+x6x4+x6x0+x6+x5+x4x1+x4x0+x3x2+x3x1+x3x0+
x2x1+x2+x1x0+x0=0

……..

Figure 4. Degree 2 boolean equation system for SM4 substitution box.

Conclusion. Data on the number of nonlinear equations, the number of unknowns, and the complexity of solving for the SM4 encryption algorithm are given in Table 1 below.

Table 1

Characterization of algebraic equations in rounds of the SM4 algorithm

Round	Linearly independent equations	Unknowns	Complexity
1	39	2^6	2^{18}
5	2535	2^{12}	2^{36}
9	5031	2^{18}	2^{55}
13	7527	2^{24}	2^{73}
17	10023	2^{31}	2^{92}
21	12519	2^{36}	2^{108}
25	15015	2^{43}	2^{129}

From this table, we can see that the SM4 encryption algorithm is robust to the algebraic cryptanalysis method after round 22.

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DATA FILTERING IN THE IMAGE PROCESSING TOOLBOX(IPT) ENVIRONMENT

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Annotatsiya: IPT muhitida Aydar-Arnasoy ko‘li tizimining tahlil. Aydar-Arnasoy ko‘li tizimining qisqacha gidrogeologik tavsifi. Aydar-Arnasoy ko‘li tizimi tasvirini raqamli filtrlash. Diskret Fure o‘zgartirish yordamida Aydar-Arnasoy ko‘li tizimi tasvirining raqamli modelini ishlab chiqish.

Kalit so‘zlar: MATLAB, LAPACK (Linear Algebra Package), BLAS (Basic Linear Algebra Subprograms), MATrixLABoratory, tasvir, morfologiya, image, Image Processing Toolbox paketi, signal Processing Toolbox va Wavelet Toolbox kabi boshqa ilovalar M-fayllari.

Аннотация: Анализ Айдар-Арнасойской озерной системы в условиях ИПТ. Краткая гидрогеологическая характеристика Айдар-Арнасойской озерной системы. Цифровая фильтрация изображения Айдар-Арнасойской озерной системы. Разработка цифровой модели изображения Айдар-Арнасойской озерной системы с использованием дискретного преобразования Фурье.

Ключевые слова: MATLAB, LAPACK (Пакет линейной алгебры), BLAS (Базовые подпрограммы линейной алгебры), MATrixLABoratory, изображение, морфология, изображение, пакет Image Processing Toolbox, Signal Processing Toolbox и Wavelet Toolbox, другие приложения M-файлы.

Abstract: Analysis of the Aydar-Arnasoy lake system in the environment of IPT. A brief hydrogeological description of the Aydar-Arnasoy lake system. Digital filtering of the Aydar-Arnasoy lake system image. Development of a digital model of the image of the Aydar-Arnasoy lake system using discrete Fourier transformation.

Keywords: MATLAB, LAPACK (Linear Algebra Package), BLAS (Basic Linear Algebra Subprograms), MATrixLABoratory, image, morphology, image, Image Processing Toolbox package, signal Processing Toolbox and Wavelet Toolbox other applications M-files.

Introduction: In the realm of digital image processing, the quality and utility of the images often hinge on the effectiveness of data filtering techniques. From enhancing image clarity to reducing noise and extracting relevant features, filtering methods are indispensable tools for researchers and practitioners alike. The Image Processing Toolbox (IPT) environment, a feature-rich component integrated into software platforms like MATLAB, has emerged as a pivotal platform for the implementation and evaluation of diverse filtering algorithms.

Literature review. Classical filtering techniques have been extensively studied and applied in image processing tasks within the IPT environment. These methods, rooted in mathematical principles and signal processing concepts, form the cornerstone of many image enhancement and noise reduction algorithms. Notable contributions include:

Median Filtering: The efficacy of median filtering in mitigating impulse noise, such as salt-and-pepper noise, has been well-documented. Studies by Gonzalez and Woods (2008) and Pratt (1978) provide foundational insights into the theory and applications of median filtering, emphasizing its robustness and simplicity.

Mean Filtering: Mean filtering, despite its susceptibility to blurring edges and details, remains a widely used technique for smoothing images and reducing Gaussian noise. Classic works by Nixon and Aguado (2008) offer comprehensive discussions on mean filtering and its variants, shedding light on its practical considerations and limitations.

Gaussian Filtering: Gaussian filtering, characterized by its ability to preserve edges while smoothing images, has found extensive application in pre-processing and noise reduction tasks. Research by Deriche (1993) and Perona and Malik (1990) explores the theoretical underpinnings of Gaussian filtering and its role in image analysis and feature extraction.

Advanced Filtering Techniques:

In recent years, advanced filtering techniques have garnered significant attention within the IPT environment, driven by advancements in computational algorithms and machine learning methodologies. These approaches offer enhanced performance and flexibility in addressing complex image processing challenges. Key studies include:

Research methodology. This feature and the problems of removing interferences of the border in the image in the form of diffusion put forward the problem of automatic processing of images, strengthening the border, that is, increasing the difference between the background and object lights. Methods for solving this problem are widely used in image processing [23].

Results and analysis. Usually, the threshold is enhanced using high-pass filters.

$$A_1(m,n)=\begin{vmatrix}0 & -1 & 0\\ -1 & 4 & -1\\ 0 & -1 & 0\end{vmatrix} \quad A_2(m,n)=\begin{vmatrix}-1 & -1 & -1\\ -1 & 3 & -1\\ -1 & -1 & -1\end{vmatrix} \quad A_3(m,n)=\begin{vmatrix}1 & -2 & 1\\ -2 & 4 & -2\\ 1 & -2 & 1\end{vmatrix}$$

As you can see, the working masks of these filters will have an average (0) value. That is, the sum of negative and positive values in the mask is equal to 0. The reason for this is that when a mask is applied, a result of 0 should be obtained for a homogeneous area, and a result other than 0 should be obtained for a boundary area. Another way to enhance the boundary field is statistical differentiation. In this case, the value of each element is divided by the statistical estimate of the mean square constraint.

$$E_{ij} = f_{ij} / 0(i,j)$$

$$0^2(i,j) = \sum_i \sum_{ji} \left[f_{ij} - Z_{ij}\right]^2$$

$$i,j - N(i,j)$$

It is calculated according to some N(i,j) circle of the coordinate point (i,j). $\overline{f}_{i,j}$ -is the average light value estimated by low-pass filtering of the source image at the point. There are many other methods of boundary enhancement that take into account different algorithms [4].

In recent years, medical filtering, which includes non-linear methods, has been widely used in image processing. This method is a classic leveling process and has the following advantages:

1. Sharp differences in field illumination - border areas are preserved.
2. Scattered point interferences are effectively smoothed out.

The essence of this method is to move through the image with a window, and the value of the center point is replaced by the value that appears when the values in the window are sorted by size. That is, if there are 5 in the center of the 3x3 window, 35, 40 on both sides, 1, 41, 52 above them and 23, 17, 89 below them, we sort them: 1,5,17,23,35,40,41,52,89 . The value in the center is 35 [5].

The median method is more effective in removing local (spurious) interference. Interferences whose size matches the filter size are completely lost. For example, interference consisting of three consecutive points in a line is completely removed using a one-dimensional 1x7 window filter, that is, interferences of size 1x1 (1≤k) are completely removed using a window of size 1x(2kQ1) loss is possible, if 1>k the interference does not change. Also, the median method does not change the background points.

Indeed, if the light of the built a_1 -in interference point in the center of the window (for clarity, let's say that of the background a<a_1) is a sequence of window points $a_0.a_1.....a_1$ ordered according to the increase in value, and from there the number of lights a is the number of lights t_1, a_1, then if the interference points t_2 are completely lost, if $t_2 \le 1 \le k$ and all the interference points $t_2 > k$ lie on the same side from the window center, they remain unchanged.

Now we can see that the background points will not change. Let the background point be in the center of the window. If we say that the background points are scattered over the image, then each window does not have more than one interference area (consisting of one or more points), which means that the center and either the right or left half of the window consists of background points $t_1 \ge k+1$, and as a result they remain unchanged [6].

For a two-dimensional window, the situation is slightly different. The fact is that the median method can miss a part of the object much larger than the window size k. But the points that "move into the background" consist of elements of a part near the boundary of the object, usually these are corner points.

At the same time, if there $1 \le \frac{1}{2}(2k+1)^2$ is a number of interference points and the interference area is not larger than half of the window area, this interference is eliminated. In filtering with the median method, interferences (or objects) consisting of points $r \le 2(k^2+k)$ and interferences intersected by no more than k rows or columns are lost [7].

The number of object (interference) elements $2k^2+2k+1$ in the window will remain unchanged. The reason we say this is that a window can always have either only background points, or background and one object interference points. If the constraint consists of points $r \le 2(k^2+k)$, the window cannot intersect these points more than $2(k^2+k$) times and the window area $2(k^2+k$ is less than half.

If the interference $t \le k$ domain intersects the line, each window (kQ1) will have different line segments that do not intersect the interference domain. Although these discussions are made for the case where the background and object are homogeneous, they are also relevant for natural phenomena of random interference. [8].

Two-valued or binary representations have finite class interference due to their simplicity compared to multi-valued ones. Logical filtering methods are mainly used to lose them.

Algorithms of these methods are heuristic, that is, the user gets filter parameters depending on the quality of the source image. Interference in dual-valued images is mainly due to four reasons:

1. Contamination, that is, interference in the original copy of the image;
2. Poor painting quality;
3. Small errors in the process of entering the image into the memory;
4. Mistakes such as wrong selection of the threshold for converting multi-valued images to dual-valued images are caused [9].

Two-valued or binary representations have finite class interference due to their simplicity compared to multi-valued ones. Logical filtering methods are mainly used to lose them.

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ACTUAL PROBLEMS OF NATURAL SCIENCES

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ISSUES OF RESEARCH AND MAPPING OF TOURIST RESOURCES OF THE REGION USING GIS

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Abstract: In this article, the geographical basis of determining the level of development of tourist resources and tourism infrastructure, scientific and practical proposals and recommendations for their improvement, the rational use of tourist and recreational resources, the development of many types of tourism activities in the future, and the improvement of the existing tourism infrastructure are detailed.

Keywords: World Travel and Tourism Council, Tourism Resources, World Tourism Organization, tourism geography, architecture, historical monuments, cultural objects.

Аннотация: В данной статье рассмотрены географические основы определения уровня развития туристских ресурсов и туристской инфраструктуры, научно-практические предложения и рекомендации по их совершенствованию, рациональному использованию туристско-рекреационных ресурсов, развитию многих видов туристской деятельности в стране. подробно описаны будущее и улучшение существующей туристической инфраструктуры.

Ключевые слова: Всемирный совет путешествий и туризма, туристические ресурсы, Всемирная туристская организация, география туризма, архитектура, исторические памятники, объекты культуры.

Annotatsiya: Ushbu maqolada turistik resurslar va turizm infratuzilmasining rivojlanish darajasini aniqlashning geografik asoslari, ularni takomillashtirish boʻyicha ilmiy-amaliy taklif va tavsiyalar, turistik va rekreatsion resurslardan oqilona foydalanish, turizmning koʻplab turlarini rivojlantirish masalalari koʻrib chiqiladi. kelajagi, mavjud turizm infratuzilmasini takomillashtirish masalalari batafsil yoritilgan.

Kalit so'zlar: Butunjahon sayohat va turizm kengashi, turizm resurslari, Jahon turizm tashkiloti, turizm geografiyasi, arxitektura, tarixiy obidalar, madaniy ob'ektlar.

Introduction. In the development of the tourism industry and its formation in accordance with international requirements, the formation of a database of tourist GIS is one of the most important issues.

Information forms the main factor in determining the task for which cards of various subjects are created, as well as when delving into any issue.

The processes of creating the tourist database under study, collecting related information, managing, updating and distributing it were carried out mainly using the Microsoft SQL Server program[4; 40-44 p.]. The creation of this database consists of the following stages:

- introduction of geophysical coordinate data, where cultural heritage indicates the geographical location of objects (coordinates, etc.);
- introduction of quantitative and qualitative indicators indicating the features of cultural heritage objects (attribute data);
- establish the interaction between these two different data (geophysics and attributes);
- cartographic data expressed by coordinates of tourist cultural heritage sites are entered into computer memory and then processed.

When creating a tourist database, many types of programs are used. Since it is convenient to identify changes in these programs and compare them with each other, this tourist database has become widespread, mainly from Microsoft Access and Microsoft SQL Server programs.

Goskomstat data when creating a database, stat.uz Internet data was widely used, as well as information from the Department of Tourism Development of Kashkadarya region. Special importance was attached to the method of tables when lifting this information. The tables were developed in advance, and a related structure characteristic of each other was formed in them. It was during the production of applications that the Microsoft SQL database was created, mainly using the Visual Basic language.

The architecture of SQL Server provides for the presence of a server component that allows you to exclude, limit, use data by clients, as well as ensure security. For example, SQL Server receives requests from client computers, which the server executes on the computer, and then returns only the requested data. Thus, a command is sent to the server to exclude one record from tables containing 10000 records, the server software executes this command, and only the record available for search is returned to the client.

Literature analysis and methods. Using maps and information on them more effectively based on new technologies, electronic and web cartographic works are complemented by traditional paper plans, maps and atlases, allowing the expansion of thematic cartographic products in the tourism sector.

The current level of computer technology development allows you to use, modify and quickly draw conclusions from tourist cartographic works using graphic editors, geoengineering systems and multimedia technologies.

FreeHand vector editor is a universal graphic editor for high-quality illustrative graphic work. In cartographic production, the program is used to equip cartographic works. A distinctive feature of the package is that it can work with a multi-sheet design and very large-scale illustrations, gaining significant acumen in creating and equipping large-format cartographic works. There is a library of conditional comments on symbols used in cartography, with the ability to create personal artistic symbols; there is a set of tools for designing tourist-themed cartographic works, and the PANTON color library (the European color standard used in cartographic products) is also used with the ability to insert photos into rastr graphic formats [1; 3-13 p.].

In the Macromedia FreeHand package, when fixing maps, the following are widely used: import and export of files in various vector and raster formats; logical relationships with objects (dividing areas of intersection of objects, scraping from one object to another, splitting objects, etc.); removal of graphic elementary shapes (points, lines, polygons) and grouping them to create conditional symbols; tasks with linear objects, including creating curly lines; equipping them with color using a standard palette or a set of colors that is determined by the cartographer; it is necessary to work with individual layers of the image, replacing objects of a mutual group; divide into several standard sheets so that large-format cartographic work can be published.

In this case, the data, in turn, is expressed in layers.

When working with the Freehand vector editor, its disadvantages are: the inability to change the projection of the received (scanned or vector) image, the generalization of individual layers of the vector image, the lack of necessary information about the resources and conditions of tourism

development associated with the objects presented on the maps, and, as a result, it is necessary not to forget about the need to change the projection of the received (scanned or vector) image.

Taking into account the above-mentioned features and disadvantages, this software product is recommended to be used at the stage of equipping the publication with the original for a high-quality and effective solution to the issue of cartographic computer graphics, work with illustrations until the moment of publication and preparation of cards for printing.

The main task of GIS as a separate hardware complex involves the collection, processing, reflection and dissemination of coordination data, the creation and use of electronic maps, atlases and other cartographic works [10; 16-17 b.].

Geoinformation systems for tourism are an area of effective application of GIS programs in order to identify information about tourism and tourist infrastructure facilities, assess tourist and recreational potential, develop tourist routes and provide a range of other activities.

The use of GIS technologies in obtaining a system map for tourist purposes provides:

- development of a thematic map based on digital maps and a database, as a result of which a high level of automation of work on mapping is achieved;
- a systematic approach to reflecting and analyzing the current situation in the cartographic provision of tourist and recreational resources and tourist infrastructure facilities in the region;
- interactivity and interactivity of tourist cartography, which allows you to combine the process of creating and using cartographic works on this topic;
- the ability to combine cartographic, textual, illustrative, audio types of information, create 3D models [6; 106-109 pages].

Another GIS program used in tourism cartographic research is the MapInfo program.

MapInfo is used in the creation, management and analysis of various subject maps that record the results of evaluation, analysis and processing of materials available in the database from the point of view of a simple PC user [9; 62-68 pages].

Its capabilities are very wide, and it can be used to create not only cartographic works, but also content-oriented Geoinformation systems thanks to the special MapBasic programming language. With its help, you can connect modules created in the Visual Basic C++ environment to the program, add an interface, develop a help system, establish communication with other programs, that is, completely create an end-user geographic information system [7; 62-68 pages].

Rsults. Working with electronic cards based on the database was explained as follows:

- interactivity, which allows you to study, update and change information, form various requirements and obtain the necessary information, develop new maps of other tourist topics Based on cartographic works and information bases;
- using the scale, making it easier to work with the map, including or excluding individual topics, which allows you to change the general geographical and informative character;
- automatic zoom setting in this part, the ability to increase or decrease the map image on the monitor is performed automatically;
- the ability to select, color sheet, line, edit and implement styles of cartographic images (symbol, area, lines in motion, cartogram, etc.)), thanks to the creation of artistic signs, an original design of a cartographic product is created;
- analysis and modeling, including searching for necessary information, tourism facilities and tourist infrastructure in the database according to individual criteria, determining location in attribute data and vice versa, choosing the optimal route, creating and processing a relief model, interpolating heights, determining visibility;
- recreational activities create wide opportunities as a result of using a variety of information to meet the diverse requirements of tourists, tourism organizers;
-layout design, map insertion, legend editing and insertion, scale selection, naming, arrangement of the inner side of the frame, arrangement of the outer side of the frame, etc.;
- publishes a map or its individual parts, bitmaps, texts, attribute tables at a scale corresponding to the general geographic and substantive content, the essence of the attribute tables.

When obtaining a regional system map of tourist goals, a database is understood as an ordered set of information about the conditions and resources of tourism development in the region, information about tourism and tourist infrastructure facilities, digitally formatted.

When obtaining a map of the regional system for tourist purposes, the database must contain the following information:

- cartographic resources and cartographic works of vector or raster form, which constitute the essence of the map content when performing work on obtaining a tourist perspective map, digital topographic and tourist maps of a specific territory or its parts, plans of large and medium-sized settlements and territories;
- semantic information that makes up territorial data and an attribute database linked to a specific object on a map or plan includes tabular information about tourism facilities and tourist infrastructure, and the information necessary for the object includes its type, shape, name, address, phone number. Additional information on groups of objects should have a form specific to each of them. For example, additional information for tourist routes includes the type of tourism, category or level of difficulty, travel days, routes, sightseeing facilities;
- graphic representation of tourism facilities and tourist infrastructure in raster formats *bmp, *jpeg, natural landscapes, museum expositions, etc.;
- text fragments describing popular tourist-excursion and tourist industrial facilities, tourist routes, linked to the graphic image of objects;
- multimedia elements containing video images and audio descriptions of monuments of tourist routes.

When working with electronic maps created in GIS, certain skills are required. Multimedia Technologies provide multimedia technologies for the popularity of cartographic works that concentrate all information in their footsteps.

The elements developed and related to the cartographic information and information system for tourism purposes in the geoinformation system include a custom application area. It allows you to control the system without other software tools, that is, to reflect tourist-oriented cartographic information and work with it using the tools popular in GIS for selecting the scale, working with the content layer, measuring distance, searching for objects and information about them on maps, entering the necessary objects for an additional user.

Discussion. During the research, the possibilities of GIS technologies, as well as materials from remote sensing of the Earth were used in the development of a methodology for creating tourist cartographic works.

The methodology of creating tourist maps consisting of four Bashkirs has been improved. The main attention was paid to the use of GIS technologies, as well as remote sensing materials.

The essence of such postcards requires a lot of work on the colorfulness of the theme, which can be reflected in them, by a wide range of consumers of different ages, its content and equipment.

Conclusion. The content of tourist maps should be described without unnecessary information, reflecting the data quite fully. The map should be well readable by tourists, expressive and beautifully designed. Maps that meet such requirements allow less access to the legend for tourists. And the excellent equipment of cartographic works, in addition to the breathtaking effect, is also an advertisement for tourism for tourist purposes.

By regions of the study at the first preparatory stage 1:10000, 1:30000, 1:50000 topographic maps of 100,000 scale, remote images from unmanned aerial vehicles were also collected, text and tabular information on the subject of tourism facilities was obtained.

At the second stage entering data into computer memory 1:10000, 1:30000, 1:50000 topographic maps of 100000 scale are also scanned and topographic bases for GIS are being prepared in Adobe Photoshop. The deleted images are linked to the topographic database and entered into computer memory based on processing in Adobe Photoshop. Regional text collections related to tourism are systematized and stored in computer memory in Microsoft Word format. Purposefully collected tables on the topic are also systematized and loaded into computer memory based on the Microsoft Excel program.

At the third stage of processing the collected materials, The topographic basis prepared for GIS in Adobe Photoshop is processed in Mapinfo and ArcGIS software. And deleted photos are decrypted using GIS Panorama and PhotoMOD programs and linked to the topographic base [6; 220-228 p., 93; 84-88 p.]. The collected texts on the topic are supplemented on the basis of processed topoassays and deleted photos, as well as new materials are identified. And the filled-in text data is systematized in the form of a table and re-entered as a new option into the computer memory based on the Microsoft Excel program.

At the stage of creating the latest, the main issue is the creation of tourist maps and their provision based on the developed tourist database.

Thus, tourist maps will consist of a system of information and documents that will be updated according to geographical location, legal status, quantity, quality of details and assessment of a particular type of economic object or other object.

According to the above methodology, the legend of their maps and the conventional signs of all geographical elements were compiled in accordance with the requirements of tourist services and taking into account the capabilities of map users. It is planned to develop a number of tourist maps taking into account the listed factors.

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IMPROVEMENT OF THE TOURIST RESOURCE MAP SYSTEM

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Abstract By the beginning of the 20th century, a new form of tourism began to develop. Ecological tourism-the purpose of ecotourism is to help preserve environmental education, nature and local mining. The development of ecotourism in the world is closely related to the creation of a system of natural areas that are subject to special protection – natural reserves, national parks, natural monuments. Today, ecotourism plays an important role in the global tourism industry. According to various estimates, ecotourism now accounts for 10-20% of the world tourism market and is the most rapidly developing sector.

Key words Ecological tourism, natural reserves, market, biomadanic, cartagemization

Аннотация К началу 20 века стал развиваться новый вид туризма. Экологический туризм – цель экотуризма – помочь сохранить экологическое образование, природу и местную добычу полезных ископаемых. Развитие экотуризма в мире тесно связано с созданием системы природных территорий, подлежащих особой охране – природных заповедников, национальных парков, памятников природы. Сегодня экотуризм играет важную роль в мировой туристической индустрии. По разным оценкам, экотуризм сейчас занимает 10-20% мирового туристического рынка и является наиболее быстро развивающейся отраслью.

Ключевые слова Экологический туризм, природные заповедники, рынок, биомаданизм, картагемизация.

Annotatsiya: 20-asr boshlariga kelib turizmning yangi shakli rivojlana boshladi. Ekologik turizm - ekoturizmning maqsadi ekologik ta'lim, tabiat va mahalliy konlarni saqlashga yordam berishdir. Dunyoda ekoturizmning rivojlanishi alohida muhofaza qilinadigan tabiiy hududlar – qo‘riqxonalar, milliy bog‘lar, tabiat yodgorliklari tizimini yaratish bilan chambarchas bog‘liq. Bugungi kunda ekoturizm jahon turizm sanoatida muhim o‘rin tutadi. Turli hisob-kitoblarga ko‘ra, hozirda ekoturizm jahon turizm bozorining 10-20 foizini tashkil etadi va eng jadal rivojlanayotgan tarmoq hisoblanadi.

Tayanch so'zlar: Ekologik turizm, qo'riqxonalar, bozor, biomadanik, kartagemizatsiya

Introduction. When studying the types of tourism in Uzbekistan, cartographic studies of tourist resources and issues of cartographic classification in the cartographic provision of tourism, the main attention is paid to the scientific foundations of systematic mapping of tourism.

Based on a systematic approach, cartographic research has been studying natural, social and other phenomena as a territorial complex for 70 years.

Based on the purposeful collection, study and systematization of special literature and Internet data, it became known that today, in systematic cartographic research, we are talking mainly about scientists from the CIS countries: M. M. Berlyant, K. A. Salishev, N.Y.Nedashkovskoy, O. I. Yelchaninov, M. M. Svatkov, V. V. Sveshnikov, A.V. Donsov, T. A. Kozachenko, G. A. Parkhomenko, etc. The main direction in the research of these scientists was a systematic approach to obtaining maps of various sectors of the national economy. But not enough data was covered on the receipt of tourism on the system card.

The result of a targeted study indicates the expediency of obtaining tourism on the system card. When forming tourist cartography, it is necessary to create a unique technology for creating maps and plans. This technology makes it possible for tourism purposes to reflect the tourist and recreational system of the plan, a series of maps and atlases with its elements, as well as systematically carry out the process of obtaining a map. To do this, the creation of tourist cartographic works will allow the development of the necessary content, the provision of modern audio and video information,

the use of geoinformation and multimedia technologies to a high level of development of tourist cartography.

Literature analysis and methods. As a result of the conducted research, it is clear that the methods, content, purpose and methods of obtaining regions of Uzbekistan for tourist purposes are insufficiently developed in this study. Obtaining tourism using the system card is one of the main directions of development of modern tourism work. The purpose of such maps is to provide tourists, tourism organizers and researchers with up-to-date and up-to-date information about the area, history, nature, culture, population and tourist infrastructure facilities, issues of tourism development and other factors. When obtaining a regional system map of tourist goals, it is necessary to reflect the activities of tourist and recreational complexes and the patterns of their development as an integrated system.

The system of cartographic works-a private, local, sub-regional and regional integrated tourist and recreational system developed according to a single style-is taken into account when obtaining a regional system map of tourist goals [4; 32-38 p.]. According to the content, scale, territorial coverage of maps, the location of tourism facilities, their condition, natural, biomadanic, historical-cultural and socio-economic tourism resources.

The system of cartographic works, which provide complementary and comparative information and are used by all participants in tourism activities, takes into account the creation of exactly the same style. In terms of content, the tourist potential in obtaining a system map and tourist and recreational activities on the administrative borders of the region includes the tourist potential and object-subject relations arising within the territorial units of the lower level [3; 52-59 p., 2; 281-286 p.].

Results. Individual tourism facilities and private-level excursions are highlighted on the regional map, plans of tourist infrastructure facilities are drawn up (Museum and exhibition complexes, architectural complexes, parks and recreation areas, landscape gardening monuments, hotels, tourist bases, sanatoriums, resorts, train stations, etc.). When designing such cartographic works, artistic anddecorative tools and visual symbols. In most cases, the scale is not given in drawings and plans. Their conditional signs are given briefly or in detail for each tourist site.

At the local level, various tourist routes (hiking, cycling, sailing, etc.) are conducted, covering natural and historical and cultural reserves, orienteering competition areas, tourist and recreational areas. Cartographic work requires a large-scale geographical base of 1:50000 and above to ensure the local level of completion of the regional system with maps for tourist purposes.

Discussion.Systematic cartography for tourism purposes covers major cities, tourist routes and administrative regions of the province at the sub-regional level. A series of tourist maps and atlases created for such purposes are made on a large scale from 1:400000 and more. When comparing with the main scale on tourist route maps, it is necessary to represent places dangerous to tourists on a large scale.

At the regional level of cartagemization, individual parts of the province, the entire province and surrounding areas are represented. Depending on the region, the map scale will be 1:50000 or less. Acquaintance with the territory is sometimes provided, however, for the passage of the route, with survey maps [9; 146-149 p.].

In the field of tourism, the main resource is the objects of tourist and tourist infrastructure, conditions and factors of development of tourist activity. This requires scientific substantiation and development of a regional system of formal provision of tourism with four structural modules (Fig.1).

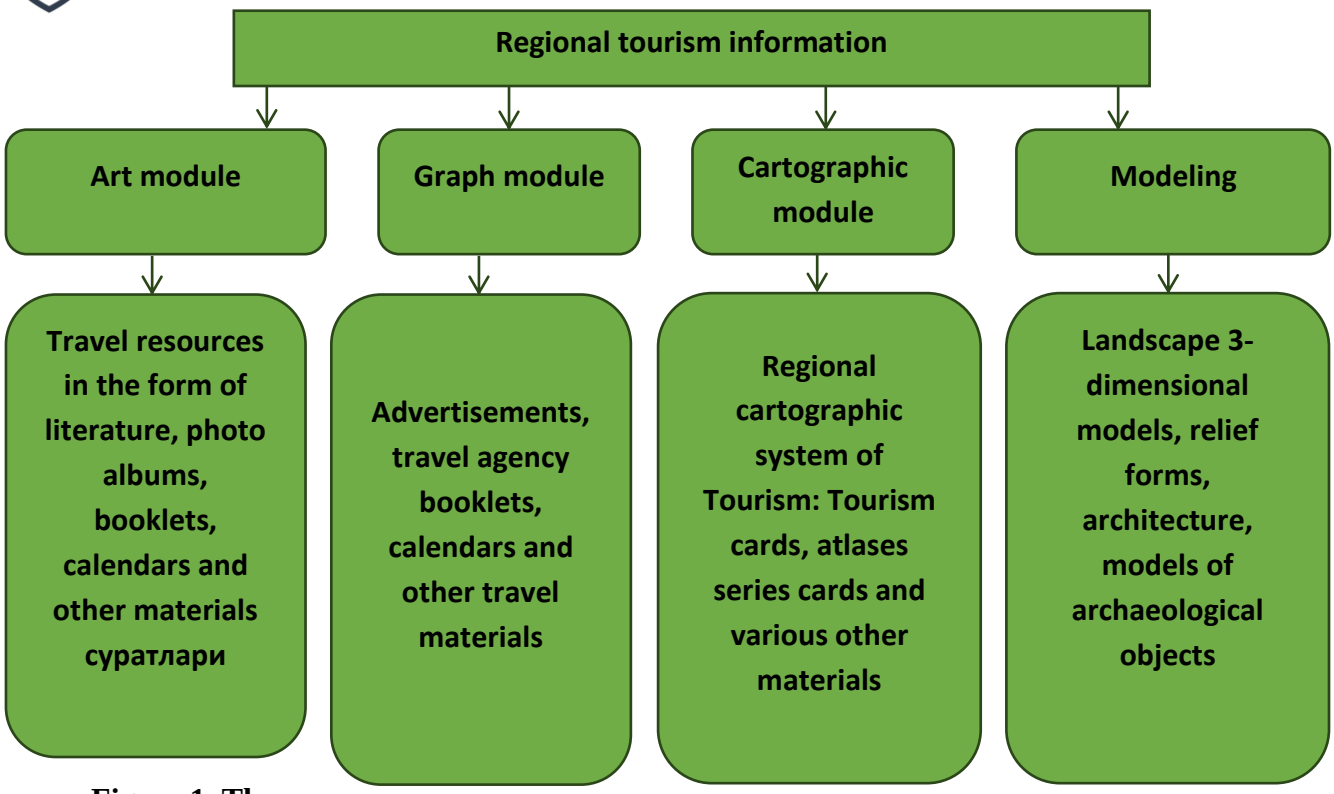

Figure 1. The scheme of information support for regional tourism

The main purpose of the information system is to provide tourists with the necessary information about the travel area, history and current state, culture and nature, population.

The artistic module of tourist information support reflects information about the region, such as local history literature, photographs, booklets, calendars and other images of tourist resources [2; 52-59 p.].

The graphic module highlights instructions for meaningful recreation of tourists, travel announcements, advertising booklets about travel agencies, calendars and other materials.

However, in the cartographic module for tourist purposes, the regional cartographic system is annotated with tourist plans, maps, serial atlas maps and various other materials.

When modeling, high-quality, reliable, illustrative and entertaining information about tourist sites in order to have a quiet time for tourists is reflected in different sizes. The system of cartographic works, designed to provide the tourism industry in every possible way, is regularly updated and updated database.

Conclusion. The peculiarities of tourism, the conditions and resources of its development are provided by specific features:

- regional tourist maps require a strictly disciplined approach, since the tourist and recreational process is associated with the interaction of various elements of human leisure activities, the activities of tourism and recreation organizers, the territory and its natural, biomedical, historical, cultural and socio-economic resources, the population and its traditions, creativity and identity. This set of elements determines the complexity of the card acquisition function;

- regional types and forms of tourism determine the main directions for obtaining a tourist map, while the activities of tourism managers in the region require cartographic works reflecting the resources of the territory for organizing tourist activities. Therefore, the development of a thematic map should be carried out in two directions for tourists and tourism organizers;

-for tourism purposes, the object of obtaining a system map is real, and the existing tourist and recreational regional complexes represent an integrated system that includes various levels of natural, biomechanical, historical, cultural, socio-economic systems. They are comprehensively presented in tourist atlases;

- designed to describe a regional system of cartographic works on this topic, it must meet such requirements as accuracy of information, targeting, reliability, modernity, completeness of information, value, system dependence of elements, concreteness, expressiveness;

- the use of local resources in a given area has a clearly defined territorial scope, which implies the use of a cartographic style. The main, additional text image from information, photo and aerospace images of monuments of natural and cultural heritage, objects of the tourist industry, tourist and recreational complex, as well as their description in the form of audio and video information (in electronic and multimedia projects);

- the need to use natural and symbolic cartographic symbols, artistic frames, color illustrations, clear fonts, as well as electronic animated symbols that are easily remembered and differentiated to clearly reflect the essence of the content of cartographic works. In addition, the system of conventional signs of all geographical and thematic objects and states should be the same, with the exception of artistic conventional signs reflecting the architectural lines of objects that make up the tourist potential of the region;

- optimization of the use of the system of cartographic works with a tourist theme is carried out by introducing a map of the city in the following sequence: first, tourist and recreational facilities, and then a new systematic legend indicating the objects of tourist infrastructure. Additional information is provided to tourists and other users in the form of comments on conventional signs;

- for tourist purposes, cartographic works should be distinguished by the non-standard character and originality of the composition of the artistic decoration and reflect the beauty of nature, the uniqueness of the landscape, the diversity of monuments, and the ethnographic significance.

It will be about the process of systematic development of the scientific basis for obtaining a regional map for tourism purposes. The problem of creating a system of interrelated and complementary cartographic works for tourist purposes has not yet been completely solved in our country. From targeted research in this regard, it became known that it is necessary first to formulate the principles of obtaining a tourist card for the subject. The concept of principle is widely interpreted as a leading and guiding idea, while in the scientific sense it underlies a particular scientific systematic direction.

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