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CHEMISTRY

DESTRUCTION OF THE PROCION RED MX-5B DYE IN A FLOW-THROUGH PLASMA REACTOR

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DOI: 10.5281/zenodo.10480850

Abstract

This study investigated the plasmochemical degradation of Procion red MX-5B. A plasma electrochemical unit was utilised to detoxify wastewater that had been contaminated with Procion red MX-5B, with a modified plasma generating module. The experiments were performed using the galvanostatic mode with a current of 45 A and voltages ranging from 21 to 24 V. The concentration of Procion red MX-5B was ascertained through the use of UV-visible spectroscopy during plasma treatment.

Plasma-chemical treatment of Procion red MX-5B dye causes rapid destruction of its molecule, as discovered in our experiment. During the initial stage, the molecule cleaves into two aromatic fragments. Following the initial cleavage, degradation of intermediate aromatic compounds commences. The decomposition products resulting from the process have low toxicity and can be effectively neutralised through biological treatment methods.

Two types of carbon-containing degradation products are formed as a result of plasmochemical degradation of Procion red MX-5B. The first one is a finely dispersed hydrophobic material that, due to its low specific gravity, hydrophobicity and the inclusion of gas bubbles, floats and concentrates near the solution-air interface. The second type consists of larger and more hydrophilic particles and accumulates in the lower part of the cell by sedimentation.

Keywords: plasma chemical reactor, wastewater, Procion red MX-5B azo dye, destruction, micro-nanocarbon.

1. Introduction

The disposal of wastewater from dyes poses an urgent and unresolved environmental problem. The production and usage of dyes necessitate substantial volumes of water. On average, each tonne of dye consumes 200-250 m3 of water. The presently utilized dyes exhibit a high level of stability. The high chemical stability and light fastness of dyes, which are essential in dyeing technology, cause challenges in treating and disposing of wastewater generated by companies that manufacture or use dyes. Untreated wastewater disrupts the ecological balance of natural water bodies, which are sources of water supply, and exacerbates the negative impact on the environment caused by human activity. The majority of dyes are harmful to plant and animal life, with carcinogenic and mutagenic effects [1, 2]. Dyes in water sources also pose a risk to human health.

Several methods such as extraction, sorption-coagulation, membrane filtration, and biological treatments have been proposed for treating wastewaters containing dyes [3-6]. The application of these methods in some cases can lead to achieving high levels of purification. Nevertheless, these methods are limited by scientific, technical, and economic factors. For instance, adsorption on activated carbon is restricted only to water-soluble dyes, biodegradation might not be effective due to the biotoxicity of many dyes, and the use of aggressive and toxic reagents (such as ozonation, UV light, H_2O_2, Fenton's reagent, electrochemical oxidation) is required for treatment. The nomenclature of dyes is broad, and various types are challenging to neutralize. Dyes are frequently found in wastewater, mixed with other organic and mineral components that pose obstacles in treatment. All the methods mentioned above require consumables such as oxidizing reagents, membranes, and sorbents, which increase the cost of the process and make it more complex. Utilizing such consumables results in the creation of secondary anthropogenic pollution in the form of spent sorbents, filtrates, concentrates, wash water, as well as poisoned and spent membranes. Therefore, the issues of treatment and disposal are replicated at another level. It is crucial to develop innovative non-waste technologies to address this problem comprehensively.

Thermal treatment is a promising method for treating such wastewater. Thermal destruction methods are universal, have simple hardware design and controls, and can be easily automated. Achieving high temperatures is a primary factor in effectively using thermal treatment for decomposing heat-resistant organic contaminants. Conventional methods struggle to use thermal destruction for large volumes of low-polluted wastewater due to considerable energy consumption for heating and water evaporation. Direct destruction in the liquid phase is preferable. This method reduces the energy consumption of phase transitions. High-temperature plasma treatment can effectively treat heat. The combined effects of high temperature, UV radiation photodestruction, and electrochemical redox processes can neutralise contaminants with high chemical stability.

The aim of this work is to study the destruction of the Procion red MX-5B dye in a flow-through plasma reactor.

2. Experimental procedure

A plasma electrochemical unit with a modified plasma generating module (see Fig. 1) was employed to destroy the dye by plasma-chemical conversion of waste water.

The electrode chamber, which is equipped with two electrodes, consists of a vertically mounted working (discharge) electrode coaxial to the tank and a horizontally mounted auxiliary electrode. The electrodes are made of a refractory alloy based on chromium and tungsten. A device is implemented in the vertical electrode to control the immersion depth and distance from the horizontal electrode. This arrangement allows for efficient and uniform distribution of the electric field throughout the cell volume, resulting in smooth plasma torch burning and reduced power consumption. The solution to be treated is 1 L.

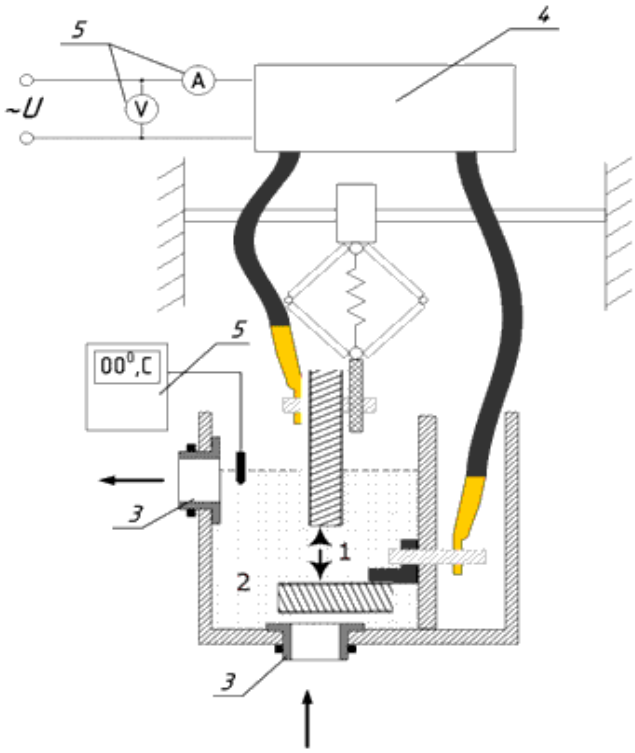


Fig. 1– Schematic of a plasma-chemical reactor for the degradation of Procion red MX-5B by plasma-chemical conversion of contaminated water in a dynamic mode.

1. Electrodes made of refractory alloy
2. Solution to be treated
3. Connections for water inlet and outlet
4. Power supply with a declining voltage/amperage characteristic.
5. Devices for monitoring.

The experiments were performed using the galvanostatic mode with a current of 45 A and voltages ranging from 21 to 24 V. The electrical parameters were selected to promote stable plasma torch combustion and to maintain reactor operation stability.

The solutions were processed in a temperature range of 20°--75°C. The background solution was prepared using 0.2 M K_2SO_4. K_2SO_4 was selected due to potential interference with sodium determination in the final solution by Na salt dyes.

Model solutions of Procion red MX-5B, Sigma-Aldrich, λ_{max} =538 nm, were used as purification objects. The reagent was not further purified since it is used in industry in this form and is present in waste water. It has the following properties – Molecular Formula: $C_{19}H_{13}Cl_2N_6NaO_7S_2$, Molecular Weight: 595.37, CAS Number: 17804-49-8.

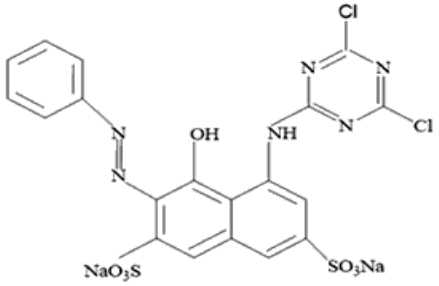


Fig. 2– Structure of Procion red MX-5B dye.

The effectiveness of the dye destruction process was monitored by measuring the decrease in the solution's color intensity over time. The initial concentration of the dye in the solution was 25 mg/L. The concentration of Procion red MX-5B in the plasma-chemical treatment process was determined using UV-visible spectroscopy. The spectra of Procion red MX-5B solutions were recorded using a Shimadzu UV2450 spectrophotometer within the wavelength range of λ = 200-700 nm. The analysis was performed using 10 mm thick quartz cuvettes. Distilled water was used as the reference solution.

The temperature was regulated and monitored during the experiment using a temperature sensor, a thermal relay, and a device that recorded the heat release curve. We conducted a qualitative analysis of decay products of Procion red MX-5B dye using a high-performance liquid chromatography (HPLC) system with a UV detector (254 nm). We used a column LiChrospher® (Merck) 100CN (5 µm) (250/4 mm, 5 µm) with hydrophobic and polar properties. We varied the mobile phase of CH_3OH/H_2O ranging from 0/100 to 100/0 over 1800 seconds at a flow rate of $1.2\text{-}10^{-5}$ s^{-1}. We measured the radiation intensity in the visible and UV ranges using an AccuMAX XRP-3000 radiometer-photometer. The radiation intensity in the UV range was determined at a wavelength of λ = 365 nm.

We measured the particle size distribution of the dispersed phase using the SOPAT method. For a detailed description of the method, refer to [7].

3. Results and discussion

Plasma-chemical cleaning combines the effects of electric field, temperature, and UV radiation on the object being treated. The alternating electric current applied to the electrodes causes the electrolysis of water, resulting in the formation of atomic oxygen and hydrogen. Furthermore, when operating the plasma chemical reactor, water molecules decompose into various radicals that form and recombine, leading to the creation of highly active intermediate compounds.

The following diagrams depict the primary schemes of radical formation and recombination:

$$H^{\cdot} + O_2 \rightarrow HO^{\cdot}{}_2 \quad (1)$$
$$H^{\cdot} + H_2O_2 \rightarrow H_2O + OH^{\cdot} \quad (2)$$
$$OH^{\cdot} + H_2O_2 \rightarrow H_2O + HO^{\cdot}{}_2 \quad (3)$$
$$H_2O^{+} + H_2O \rightarrow OH^{\cdot} + H_3O^{+} \quad (4)$$
$$e^{-} + OH^{\cdot} \rightarrow OH^{-} \quad (5)$$
$$e^{-} + H^{\cdot} + H_2O \rightarrow OH^{-} + H_2 \quad (6)$$
$$e^{-} + H_2O_2 \rightarrow OH^{-} + OH^{\cdot} \quad (7)$$
$$e^{-} + H_2O \rightarrow OH^{-} + H^{\cdot} \quad (8)$$

Free radicals recombine with each other and ions present in the aqueous solution to form active compounds H_2O_2, O_2 and H_2 according to the following schemes:

$$2OH^{\cdot} \rightarrow H_2O_2 \quad (9)$$
$$2HO^{\cdot}{}_2 \rightarrow H_2O_2 + O_2 \quad (10)$$
$$H^{\cdot} + HO^{\cdot}{}_2 \rightarrow H_2O_2 \quad (11)$$
$$OH^{\cdot} + HO^{\cdot}{}_2 \rightarrow H_2O + O_2 \quad (12)$$

Electrochemical reactions on the electrodes produce various free radicals with both oxidizing and reducing properties. Some free radicals recombine to form water and generate heat, while others react with reactive solution components. Both oxidation and reduction reactions occur in this non-stationary process. The dye molecules undergo transformations, resulting in changes and destruction of their structure, and decomposition of some, while forming other intermediates. Heating the solution and intense UV radiation from the plasma torch facilitate the destruction of the molecules by forming reactive particles in the solution.

The plasma-chemical unit causes a significant visual change in the dye solution within the first 5-7 minutes. The changes in absorption e within the 200-700 nm range, depending on treatment time, are illustrated in Figure 3. The visible region's absorption maximum (515-550 nm) that determines the dye's red colour decreases gradually (see Figure 3).

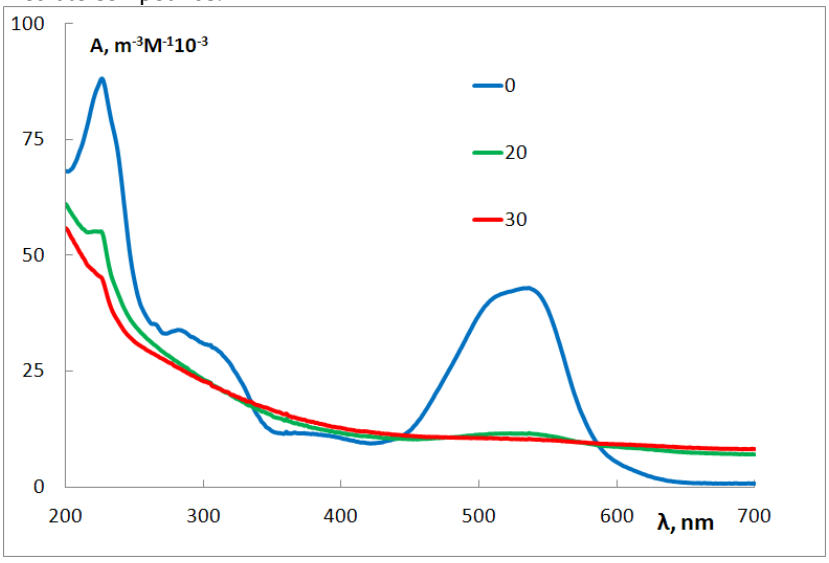


Fig. 3 – The absorption spectra of Procion red MX-5B dye in the UV and visible regions as a function of treatment time (minutes).

This process corresponds to the decomposition of the chromophore diazo group N = N in the dye molecule. In the UV region of the spectrum, the decay of the diazogroup corresponds to a decrease in absorption in the 290-310 nm range [5]. The dye molecule decomposes into two fragments; fragment 1 consists of a benzene ring, and fragment 2 consists of a naphthalene and triazine ring. At the same time, hydrolysis of sulfo groups in aromatic rings occurs. The continued destruction of fragments 1 and 2 is likely to result in the cleavage of the triazine ring and the production of oxidation products of the benzene and naphthalene rings, ultimately leading to the destruction of fragment 2. The breakdown of aromatic rings is linked to variations in absorption in the 270-275 nm range [5, 6] and occurs at a slower rate than that of the chromophore diazogroup N = N. A 27% decline in absorbance in the 270-275 nm range was observed 20 minutes after treatment, causing the formation of aromatic fragments 1 and 2 (Fig. 3), which also absorb UV radiation in this range. Subsequently, the formation of quinone, naphthoquinone, benzoic acid, muconic acid, and other compounds may occur.

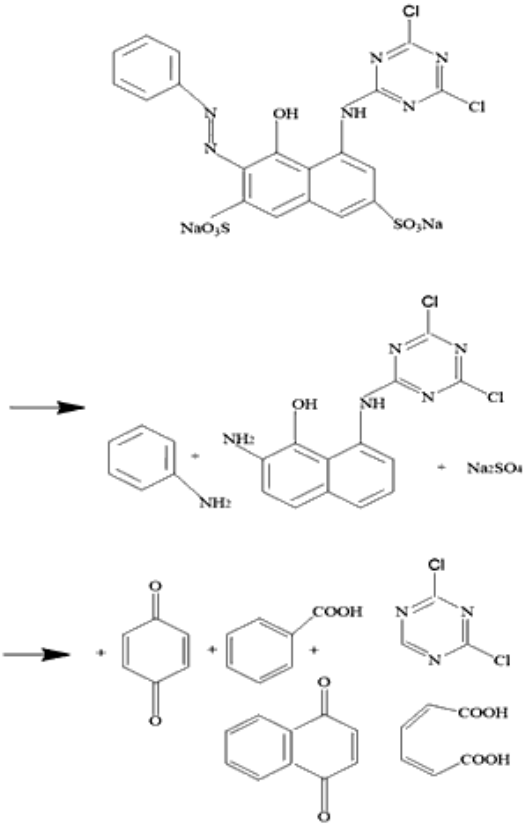
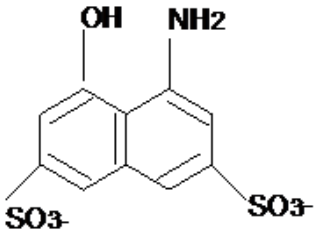
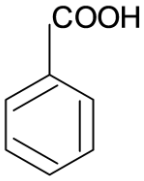
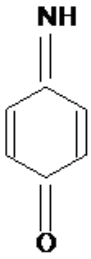
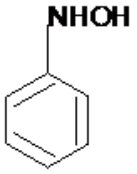
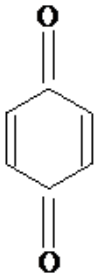
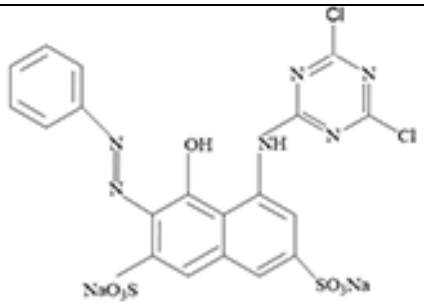


Fig. 4– Possible mechanisms for the degradation of Procion red MX-5B in a plasma reactor.

Simultaneously, the absorption maxima shift to the corresponding parts of the spectrum for the formed structures of destruction intermediates, as depicted in Figure 4. Plasmochemical destruction of Procion red MX-5B is nearly complete within 20 minutes. Further degradation is significantly slower and infeasible due to the subsequent rise in power consumption. It is recommended to combine plasma chemical treatment with biodegradation techniques.

Table 1

The degradation products of the dye were observed after 30 minutes of plasma-chemical treatment

Chemical structure	Retention time, min.
	1.67
	1.75
	2.21
	2.45
	3.85
	12.6

The compounds formed during the breakdown of the dye molecule are not highly toxic and can be successfully neutralized by biological treatment methods.

Figure 5 shows the changes in the intensity of visible and UV radiation during the destruction of the dye. The intensity decreases in the first minutes of the plasma-chemical module operation. This is due to the formation of a large number of carbon-containing dye degradation products in the solution, which have colloidal dimensions and absorb a significant part of the radiation in the visible and UV spectra. The curve for the UV spectrum is less sloping, which is associated with the destruction of the dye and a decrease in its contribution to the total absorption of UV radiation. After 15 minutes of cell operation, a slight increase in radiation intensity is observed due to sedimentation and floating of degradation products. The solution gradually brightens.

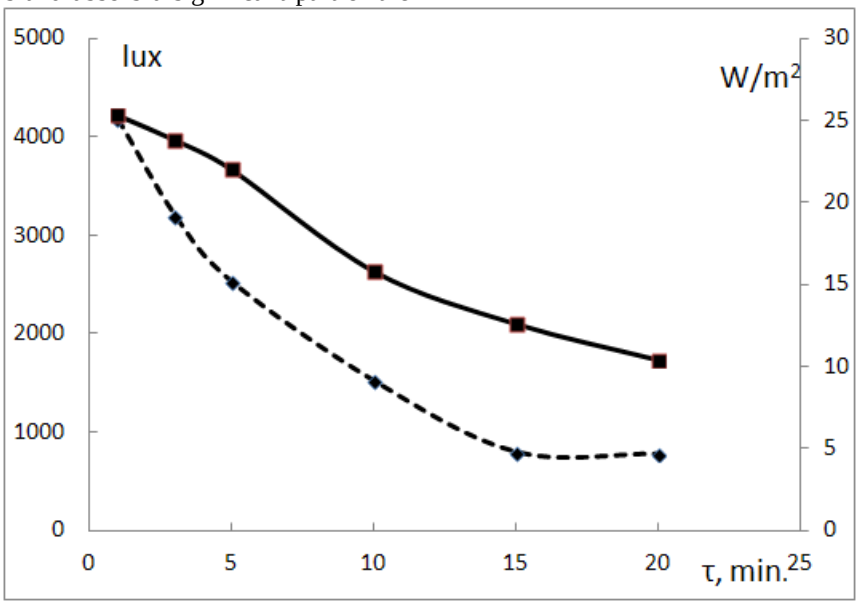


Fig.5 – Changes in the intensity of visible (dashed line, left scale) and UV radiation (solid line, right scale)

Two types of carbon-containing degradation products are formed. The first one is a finely dispersed hydrophobic material that, due to its low specific gravity, hydrophobicity and the inclusion of gas bubbles, floats and concentrates near the solution-air interface. The second type consists of larger and more hydrophilic particles and accumulates in the lower part of the cell by sedimentation.

Their particle size distribution is illustrated in Figure 6. As can be seen from the above integrated size distribution curves, the sediment consists of large conglomerates, the vast majority of carbonaceous material in it is larger than 50 microns, so it is rapidly sedimented with enlargement and formation of large conglomerates. Some carbonaceous material that floats to the surface of the water-air interface is much smaller. Particles with a size of 1 to 5 microns predominate, while at the same time, smaller particles of the order of hundreds of nanometers are quite visible.

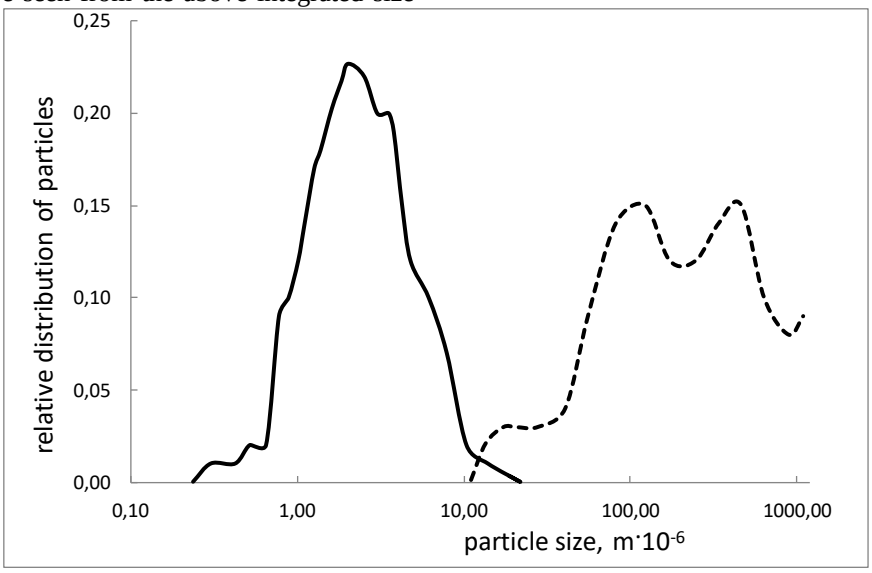


Fig.6 – The carbon material's particle size distribution obtained by plasma-chemical conversion of the Procion red MX-5B dye is shown by the solid curve on the surface and the dashed curve in the precipitate.

4. Conclusions

The plasmochemical destruction of Procion red MX-5B was studied. A plasma electrochemical unit with a modified plasma generating module was used to treat wastewater contaminated with the dye. The concentration of Procion red MX-5B during plasma treatment was determined by UV-visible spectroscopy. The spectra of Procion red MX-5B solutions were recorded on a Schimadzu UV2450 spectrophotometer, wavelength range λ = 200-700 nm.

It was found that plasma-chemical treatment of Procion red MX-5B dye causes rapid destruction of its molecule. At the first stage, the molecule splits into two aromatic fragments. Subsequently, the degradation of intermediate aromatic compounds begins. The resulting decomposition products have low toxicity and can be successfully neutralised by biological treatment methods. In the future, it is planned to study the degradation of dye decomposition intermediates in more detail and to investigate the possibility of their neutralisation by combining plasmochemical destruction with further biological treatment.

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COMPUTER SCIENCES

THE EVOLUTION OF AI: TRANSFORMING COMMUNICATION THROUGH LANGUAGE MODELS AND COMPUTER VISION

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DOI: 10.5281/zenodo.10480852

Abstract

This article presents an in-depth analysis of the integration of large language models (LLMs), with computer vision in AI, which is changing the way humans interact with computers. It highlights how advances in natural language processing, enhanced by LLMs, and computer vision are improving AI applications such as chatbots, virtual assistants, and image recognition technologies. Combining the advanced language understanding of LLMs with the image processing capabilities of computer vision leads to richer, more immersive interactions. The article goes on to discuss the important role of convolutional neural networks in image analysis and the relevance of edge computing for efficient processing of large data sets. It concludes with a consideration of the ethical implications and responsibilities in the development of artificial intelligence technologies.

Keywords: Artificial Intelligence, Large Language Models (LLMs), Computer Vision, Natural Language Processing (NLP), Convolutional Neural Networks (CNNs), Ethical Implications in AI Technology.

Introduction

The development of artificial intelligence (AI) has opened an era of transformation in technology, redefining the boundaries of human-computer interaction. This transformation is largely due to the rapid development of two key areas of AI: large language models (LLMs) and computer vision. These technologies, which once operated in different areas, are now converging, creating a synergy that promises to change the way we interact with machines in an incredible way. The point of this article is to explore this potential integration by focusing on how the combination of LLM, with computer vision technologies is setting a new paradigm in AI-driven applications [1]. In the field of LLM, this development has been particularly revolutionary. Powered by huge datasets and a complex set of algorithms, these models have demonstrated an extraordinary ability to understand, generate, and manipulate human language. They are not only transforming the analysis of textual data, but also redefining how machines understand and respond to human queries. The evolution of LLMs is marked by a growing ability to provide contextually relevant and consistent answers, making interaction with artificial intelligence more natural and intuitive.

At the same time, computer vision has made significant progress, allowing machines to interpret visual data with a level of accuracy never before achieved. This field, based on the ability to process and understand images and video, is key to a wide range of applications, from autonomous vehicles to medical diagnostics. The effectiveness of computer vision systems, especially in object detection, image recognition, and scene understanding, has been greatly enhanced by the development of convolutional neural networks (CNNs), a class of deep neural networks most commonly used for visual image analysis. The combination of LLM and computer vision marks a significant evolution in AI [2]. This integration is not just a technical achievement, but a step towards creating AI systems that can understand and interact with the world in a way similar to human perception and reasoning. The potential applications of this convergence are wide and varied, covering areas such as autonomous systems, healthcare, security, and customer service, to name but a few.

The article also aims to delve into the ethical aspects of these rapidly evolving technologies. As AI systems become more and more integrated into our daily lives, addressing privacy, security, and ethical decision-making is of paramount importance. Therefore, the development and deployment of artificial intelligence technologies must be conducted within a framework that prioritizes responsible and ethical practices.

Large language models with computer vision in AI.

As we look deeper into the significant advances in artificial intelligence (AI), it is important to understand the significant advances made in AI language models. These models have fundamentally changed the landscape of machine intelligence, especially in how they understand and interact with human language. Their evolution marks a turning point in the field of AI, opening up new avenues for human-machine interaction. In this context, the following key points reflect the essence and trajectory of these advances in AI language models [2]:

1) Advanced AI language models have revolutionized the way machines understand and interpret human language.

2) These complicated models are able to produce responses that are not only meaningful, but also contextually sensitive, suitable for a wide range of applications.

3) The ongoing development of these AI language models has the potential to transform the dynamics of human-computer interaction.

4) Advances in AI language models have greatly

enhanced the ability to communicate and generate code efficiently.

5) The integration of these AI language models with aspects of human-computer interaction opens the door to revolutionary possibilities that benefit various industries and individuals.

Natural Language Processing and Computer Vision in AI. In the field of artificial intelligence (AI), Natural Language Processing (NLP) and Computer Vision (CV) are two fundamental pillars that significantly improve human-machine interaction and enrich machine understanding of our environment. NLP focuses on the ability of a machine to interpret and articulate human language using various techniques such as text and sentiment analysis, speech translation, and speech recognition. This involves using machine learning algorithms to process large amounts of text, giving machines the ability to produce responses that are not only coherent but also relevant to the context. Thanks to advances in NLP, chatbots and AI-driven virtual assistants have evolved to more meaningful and intelligent dialogues with users. On the other hand, CV focuses on giving machines the ability to process and understand visual information, essentially simulating human visual perception [3]. This field includes techniques such as object detection, image and video recognition, and is based on learning algorithms on large data sets. Such training allows machines to perform complex tasks such as face recognition, object tracking, and complex scene analysis. Advances in the field have played an important role in the development of technologies for autonomous driving, surveillance systems, and augmented reality.

The combination of NLP and CV in AI technologies has resulted in more engaging and intuitive interactions between humans and machines. An example of this is AI-powered virtual assistants such as Amazon's Alexa and Apple's Siri, which use NLP to process user commands and AI to recognize individual users and their environment. Chatbots and AI-powered virtual assistants powered by NLP and AI capabilities have become ubiquitous in our daily lives, offering personalized interactions and significantly changing the way we interact with technological devices.

At the heart of natural language processing (NLP) and computer vision (CV) in AI are machine learning algorithms, which serve as a critical foundation for these technologies. These algorithms are able to extract patterns and insights from large data sets. This learning process allows machines to gradually improve their ability to understand and interpret both human language and visual information. The continuous development and improvement of these machine learning algorithms play a crucial role in expanding the capabilities and increasing the effectiveness of NLP and CV technologies.

The integration of natural language processing (NLP) and computer vision (CV) within AI has led to a number of effective applications in various industries. Key applications include

For NLP:

- AI-powered chatbots offering customer support and services.

- Advanced text analysis tools for sentiment and market research.

- Language translation systems for seamless multilingual communication.

- Speech recognition technologies to improve voice-controlled systems.

For CV:

- Face recognition systems used for secure access and authentication.

- Object detection capabilities that are crucial for the functioning of autonomous vehicles and robotics.

- Image classification methods used for content filtering and moderation.

- Video analysis tools used in surveillance to detect anomalies and threats.

As NLP and CV technologies continue to evolve at a rapid speed, they push AI to more complex and human-like interactions [4]. Using machine learning algorithms, these technologies give machines the ability to interpret and analyze human language and visual data. This not only increases the productivity and efficiency of various industries, but also provides deeper insights and enhanced experiences for humans.

Large language models have revolutionized the field of artificial intelligence by expanding the boundaries of understanding and generating human-like text. One of the most prominent examples is GPT-4, which has set new standards in language understanding and generation. Trained on huge amounts of data, these models are able to generate coherent and contextually relevant responses, making them incredibly valuable for a wide range of applications.

Code generation. Large language models have demonstrated excellent code generation skills. They can generate code snippets for different programming languages based on the provided hints and contextual clues. This capability simplifies the software development process and increases developer productivity.

Large language models have the potential to revolutionize the way we write code. They provide developers with intelligent hints and automated code generation, making programming faster and more efficient.

Answering requests. Another application of large language models is answering queries and providing contextual answers. These models can understand complex questions and generate informative and accurate answers based on their large knowledge base. This capability has the potential to transform information search and improve user experience in a variety of industries.

Contextual answers. Large language models excel at generating contextually relevant responses that take into account the nuances and intricacies of a conversation. Using their deep understanding of the language and vast training data, these models can generate responses that match the context and intent of the conversation. This ability makes interacting with AI systems more natural, increasing user satisfaction and engagement. Large language models have changed the AI landscape by giving machines the ability to understand and generate human-like text. From generating code to answering queries, these models offer enormous poten-

tial for automating tasks and improving human-computer interaction.

Computer vision in artificial intelligence is an exciting field that focuses on equipping machines with the ability to interpret and process visual information that replicates human visual perception. Using complicated algorithms and techniques, this field enables machines to perform a variety of tasks, such as:

1. Object detection: The ability to identify and accurately locate objects in images or videos.

2. Image classification: Classifying images based on their inherent content and characteristics.

3. Pattern recognition: The extraction and identification of meaningful patterns and structures from visual data.

The use of computer vision is widespread in many industries, leading to transformational changes and facilitating automation. For example, face recognition systems are based on computer vision algorithms to recognize people by their facial features. Similarly, autonomous vehicles rely heavily on computer vision to perceive and navigate their environment, enabling safer and more efficient travel [5]. This field is changing the way we interact with technology and the environment, bringing us closer to creating artificial intelligence with human-like visual perception. Computer vision gives machines the ability to 'see' and understand visual information, bringing us closer to human-level AI perception. A key element of computer vision is deep learning models, in particular, convolutional neural networks (CNNs), which are adapted to process visual information. Trained on large data sets with labeled images, these models acquire the ability to distinguish complex features and patterns characteristic of different objects or concepts. Integrating computer vision with other AI technologies, such as natural language processing, opens up new horizons for intelligent systems. This combination allows machines not only to interpret visual data but also to understand speech, which leads to more detailed and context-sensitive responses.

Below is an overview of the various applications of computer vision in various industries, demonstrating its broad impact and usefulness.

Table 1

Various applications of computer vision in different industries

INDUSTRY	APPLICATION
Retail	Automated checkout systems
Healthcare	Medical image analysis
Manufacturing	Quality control
Surveillance	Facial recognition
Transportation	Autonomous vehicles

The deployment of computer vision in various industries is leading to increased efficiency, security, and decision-making accuracy. As computer vision technologies continue to evolve, even more revolutionary applications are expected to come along that will have a significant impact on the future landscape of artificial intelligence and the nature of human-computer interaction.

Convolutional Neural Networks (CNNs) are the fundamental basis for the success of numerous computer vision applications, revolutionizing the way we identify and analyze images [6]. CNNs function by decomposing images into pixel matrices, applying filters to recognize different elements in those images. This method allows them to detect distinct patterns, shapes, and features, making it easier to accurately classify images and recognize objects. One of the main advantages of CNNs is their ability to learn directly from raw pixel data, bypassing the need to create features manually. Using multiple layers of convolution and pooling, these networks are adept at capturing complex visual images. Such deep learning methodologies allow CNNs to extract complex, high-level features from images, thereby improving the accuracy of image identification.

Recently, an advanced technique known as Vision Transformers has been developed to further improve computer vision models. These transformers use self-awareness mechanisms to understand the broader context and interdependencies in an image, improving the model's understanding of complex visual scenarios. CNNs have played a crucial role in the development of computer vision by enabling machines to analyze and interpret visual information more efficiently. The combination of deep learning approaches with CNNs has led to significant improvements in tasks such as image classification, object detection, and semantic segmentation, making CNNs the preferred choice in these areas.

For image classification, a pre-trained CNN model, such as VGG16 or ResNet, is used to extract features from images. These features are then fed into a fully connected layer for image classification.

In object detection, algorithms such as selective search are used to identify potential object regions in the image. Subsequently, a CNN-based model, such as Faster R-CNN or YOLO, is used to both classify and pinpoint the location of objects.

For semantic segmentation, use a fully convolutional CNN framework, such as U-Net or DeepLab, which is designed to classify every pixel in the image, resulting in a detailed pixel-level segmentation map.

Using the power of deep learning in combination with CNNs, the field of computer vision is constantly evolving. These developments are having a significant impact on various sectors, including healthcare, autonomous vehicle development, surveillance systems, and more, illustrating the wide-ranging implications of these technological advances in computer vision.

Deep Learning in Computer Vision.

Deep learning, a specialized branch of machine learning, uses neural networks to process data and predict outcomes and plays a key role in computer vision

[7]. This technique has led to significant advances in image processing and product quality, as it allows machines to take over complex tasks traditionally performed by human experts, improving the overall quality of products. Deep learning is based on neural networks, which consist of interconnected nodes or "neurons" that process and transmit data. These networks, which mimic the structure and functioning of the human brain, are able to recognize patterns and extract valuable information from complex data sets, including images. In computer vision, neural networks are able to autonomously recognize objects, identify faces and classify images, ensuring the accuracy and reliability of visual information processing. This opens up a wide range of applications in various industries. The contribution of deep learning to computer vision is particularly evident in image processing and analysis. By learning from large data sets, these models can distinguish complex details in images and perform tasks such as image segmentation to identify and isolate specific areas, which is crucial in areas such as medical imaging for diagnosis and treatment. Deep learning also facilitates the extraction of high-level image features, improving image understanding and interpretation, which is essential for object recognition and scene analysis.

In product quality control, deep learning has revolutionized sectors such as manufacturing and retail [8]. Neural networks analyze product images to detect defects with high accuracy. In the automotive industry, for example, deep learning-driven vision systems inspect cars for defects during production. In retail, these systems can also detect damaged or expired products on the shelves, ensuring high product quality and improving customer satisfaction. The use of deep learning in computer vision has dramatically changed the ability of machines to perceive and analyze visual data, significantly improving image processing and quality control in all industries.

Edge computing is another transformative development that brings AI closer to data sources to develop intelligent systems in real time. By decentralizing computing power and decision making to the edge of the network, edge computing offers significant benefits to various industries. The main advantage of edge computing is the ability to make decisions instantly. Instead of being dependent on centralized systems, they enable local data analysis and AI processing. This is crucial in scenarios such as autonomous vehicles and industrial automation, where real-time decisions are essential. Edge computing is also a solution to the challenges of processing large amounts of visual data in computer vision applications. By processing data on edge devices, network bandwidth is relieved and data protection and security are increased.

Edge computing thus revolutionizes the integration of AI into systems, enables real-time intelligent decision-making and increases productivity, allowing companies to fully exploit the potential of AI for more effective human-computer interaction.

The most important advantages of edge computing:

- Facilitation of real-time decision-making processes.
- Increased efficiency and faster responsiveness.
- Reduced delays and more efficient processing of data.
- Increased data confidentiality and security measures.

Integration of Computer Vision and Large Language Models.

The combination of computer vision and large language models marks a significant advance in the field of AI, combining the power of visual understanding with complex language processing. This combination expands the possibilities of AI applications, allowing machines to interpret visual information and respond to it in a human-like language, thus opening up many new possibilities. The ability of computer vision to interpret and process visual data adds an important visual aspect to the ability to understand large language models. This optimization enhances the understanding of visual information, allowing machines to identify objects, recognize patterns, and make decisions based on visual cues [9].

Meanwhile, large language models contribute to computer vision by enabling machines to formulate descriptions, explanations, and contextual responses to visual data. This integration not only enhances the communication skills of AI systems, but also makes human-computer interaction more intuitive and natural. Imagine an AI system that can not only recognize objects in an image, but also offer detailed descriptions, contextualize the scene, and engage in relevant discussions about it. The combination of computer vision and large language models is a step toward such sophisticated capabilities. This integration allows machines to perceive and make sense of the world in a way similar to human perception, offering deeper insights, more accurate and contextually relevant responses, and a better overall understanding of both visual and textual data.

Impact of AI on Various Industries. Artificial intelligence technologies, in particular the integration of computer vision and large language models, have had a significant impact on various industries, leading to notable improvements and innovations [10]. Here is an overview of how this technology is transforming various industries:

1. Enhancing security through contextual understanding:

AI combined with computer vision has led to the development of advanced context-aware security systems. These systems use sophisticated algorithms and real-time analysis to proactively detect and respond to potential security threats. Capable of detecting unusual behavior, objects, or anomalies in video streams, they enhance security in public places, airports, and commercial buildings.

2. Transformations in healthcare:

The healthcare industry has benefited greatly from AI, using it to improve diagnosis, personalize treatment, and enhance patient care. Using large language models and computer vision, AI programs are able to analyze medical images such as X-rays, CT scans, and

MRIs to better detect and diagnose diseases. In addition, AI-driven virtual assistants and chatbots offer ongoing healthcare support by providing personalized advice and responding to patient queries.

3. Revolutionizing inventory management:

AI has modernized inventory management systems, making them more efficient in supply chains and logistics operations. Integration of AI with computer vision and large language models allows these systems to effectively manage inventory, forecast demand, and automate replenishment. Real-time analysis of visual data from sensors and cameras helps maintain accurate inventory levels, minimizing errors and shortages.

4. Improving production quality control:

In manufacturing, the use of AI technologies such as computer vision and large language models has significantly improved quality control. AI systems analyze visual data during production to detect defects, evaluate product specifications, and conduct real-time quality checks, thereby improving product quality, reducing waste, and increasing operational efficiency.

The ongoing development of artificial intelligence continues to impact various industries and change their structure. Context-sensitive security, AI in healthcare, efficient inventory management, and improved quality control in manufacturing are prime examples of the transformative effects of AI. By leveraging the power of computer vision and large language models, companies can optimize their operations, strengthen security measures, and improve the quality of products and services.

The Future of AI and Human-Computer Interaction. Combining large language models with computer vision is a major achievement in the field of artificial intelligence and human-computer interaction. This synthesis opens up new possibilities for creating personalised user experiences, reducing operational costs and increasing overall efficiency. Large language models allow machines to understand human speech and interact with it in a more intuitive and contextual way. This advancement contributes to the creation of personalised experiences, catering to individual preferences and establishing a stronger connection between humans and machines. The integration of computer vision with artificial intelligence gives machines the ability to interpret and comprehend visual information. This development allows for more engaging and dynamic interactions as machines are able to identify objects, interpret scenes and understand human gestures, thereby deepening their understanding of human intent. The development of artificial intelligence technologies is accompanied by a number of challenges, including trust, privacy, security and ethics. Addressing these issues is crucial to shaping the future of human-computer interaction. Ensuring the responsible and ethical use of artificial intelligence technologies is key to maintaining user trust.

A focus on privacy and security is essential as AI continues to evolve to protect user data from potential misuse. Implementation of robust security measures and adherence to ethical principles are essential to maintain public trust in AI systems.

Transparency also plays an important role in building trust between users and AI systems. Providing clear and understandable explanations for the decisions made by AI helps users to trust and understand the results of these systems.

Conclusion. The integration of large language models with computer vision is a major breakthrough in artificial intelligence, laying the groundwork for a future in which machines can interact with and understand the world in previously unimaginable ways. The development of language-based AI models has significantly changed the landscape of human-computer interaction, enabling these models to produce responses that are not only coherent but also contextually relevant for a wide range of applications.

The combination of language understanding and visual interpretation in machines opens up unprecedented opportunities for both industries and individuals. We can expect to see smarter surveillance systems, more accurate medical diagnostics, optimised inventory management, and enhanced quality control in manufacturing - all thanks to AI.

However, as we move into a new era of AI-powered human-computer interaction, it is critical that issues related to trust, privacy, security, and ethical considerations are addressed and managed. Responsible deployment and use of AI technologies is essential to ensure that the advances brought about by the fusion of large language models and computer vision are both useful and safe. Addressing these issues is key to realising the full potential of these technologies, revolutionising the way we interact with machines and shaping a future that is consistent with our aspirations and ethical standards.

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CONSTRUCTION AND ARCHITECTURE

РОЗВИТОК ТЕХНОЛОГІЇ БЕЗКРАНОВОГО ПІДЙОМУ ВЕЛИКОРОЗМІРНИХ ПОКРИТТІВ

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THE DEVELOPMENT OF TECHNOLOGY FOR CRANE-LESS LIFTING OF LARGE-SIZE ROOF STRUCTURES

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Анотація

В статті представлене напрацювання організаційно-технологічного рішення безкранового підйому великорозмірних покриттів з застосуванням гідравлічних домкратів. Були проаналізовані відомі рішення підйому покриттів з використанням методу підрощування колон і розроблена нова технологія підйому. Згідно нового рішення підрощування секцій підйомників виконується між спареними проектними колонами. Розроблена технологія дозволяє суттєво зменьшити строки та вартість робіт по підйому покриттів на висоту 34 м і більше.

Abstract

The article presents the development of an organizational and technological solution for crane-less lifting of large-sized roofs using hydraulic jacks. An analysis of known solutions for lifting of roofs using the column growing method and a new lifting technology was developed. According to the new solution, the growth of lift sections is executed between the twin design columns. The developed technology allows to significantly reduce the time and cost of work on lifting roofs to a height of 34 m and more.

Ключові слова: метод примусового переміщення, безкрановий підйом, великопрольотне покриття, гідравлічний підйомник, підрощування колон.

Keywords: forced displacement methods, crane-less lifting, large-size roof, hydraulic lifting device, growing columns.

Актуальність проблеми

В процесі будівництва промислових об’єктив з одноповерховими велико- прольотними виробничими цехами найбільш складним і працеємким етапом є монтаж конструкцій великопрольотних покриттів, маса яких більше 1000тн. При використанні традиційних кранових технологій вільного підйому елементів конструкцій [1, с.91] і виконання комплексних робіт по утворенню конструктивно-технологічного блоку покриття на висотних відмітках 24 – 34м обов’язковою складовою технологічного процесу є влаштування багатоярусних риштувань і монтажних площадок на значних висотах. При цьому часові затрати на доставку елементів покрівельних конструкцій, що збираються в конструктивно-технологічний блок дуже великі, що призводить до збільшення загальних строків робіт по будівництву промислових об’єктів. Монтажні роботи по утворенню великопрольотних покриттів тільки за допомогою кранів дуже працеємкі і визначаються, як економічно невигідні. Привабливим з точки зору організації, технології, тривалості і вартості робіт по зведенню великопрольотних покриттів є варіант, при якому за наявності загального підходу до процесу утворення конструкцій великопрольотних покриттів на низьких риштування [2,с.57–59] з використанням традиційної кранової технології , були сформовані різні організаційно-технологічні та конструктивно-технічні рішення по примусовому підйому покриттів на проектні відмітки [3, с.12-14]. Спільним для декількох варіантів примусового переміщення великопрольотних покриттів на проектні відмітки є методи виштовхування з використанням гідравлічних підйомних установок [4, с.50-52]. Вдосконалення відомих технологій безкранового підйому покриттів за допомогою гідравлічних підйомників є нагальною і актуальною проблемою.

Аналіз публікацій

Розробкою науково-теоретичних рішень технології спорудження промис-лових об’єктів з великопрольотними конструктивно-технологічними блоками покриттів займались відомі українські та зарубіжні вчені. Серед українських вчених найбільший вклад в розробку технологічних рішень по зведенню покриттів промислових об’єктів традицій-

ними крановими і безкрановими технологіями зробили Афонін І.А., Евстратов Г.І., Штоль Т.М. Федоренко П.П., Шкромада А.А. Назаренко В.Ф., Ситнік Н.П., Ніколаев В.В Балицький В.С., Гончаренко Д.Ф., Торкатюк В.І., Топчій В.Д., Тонкачеєв Г.М., Черненко В.К., Ніжніковський Г.С. [1-6]. Серед закордонних вчених великий внесок в розробку науково-теоретичних рішень кранових і безкранових технологій зведення покриттів промислових та громадянських об'єктів зробили L. Rowinski, K. Fidler, K. Fliger [7, 8].

Мета роботи

В справжній роботі за мету ставилось виконання досліджень відомих організаційно-технологічних рішень по примусовому підйому великопрольотних покриттів методом підрощування колон і на закладі аналізу переваг і недоліків існуючих рішень напрацювання нових технологій підйому конструктивно-технологічних блоків покриттів, які в процесі вертикального переміщення спираються на підрощувальні стволи підйомників. При цьому, підрощування стволів підйомників виконується між направляючими, функцію яких виконують проектні несучі колони.

Виклад основного матеріалу досліджень

В справжній роботі виконаний детальний аналіз переваг та недоліків організаційно-технологічних і конструктивно-технічних рішень безкранового підйому великопрольотних покриттів, які переміщувались на проектні висотні відмітки зі спиранням на підрощувальні колони. При цьому. за умови розташування гідропідйомників під підрощувальними колонами, метод підрощування колон класифікується, як «нижнє підрощування колон» [3, с.35].

Характерним прикладом підйому великопрольотного покриття методом підрощування зі спиранням на проектні колони (Рис.1, а) є будівництво ангару в м. Абінгтон, Велика Британія в 1957 році фірмами Ove Arup and Partners та John Laing and Son Ltd. [8,с.20]. Покриття складалось з трьох монолітних залізобетонних сегментів (розміри в плані кожного сегменту 33,53 х 59,59м) та спиралось на чотири бетонні колони (загальна маса покриття 1400 тон). Процес

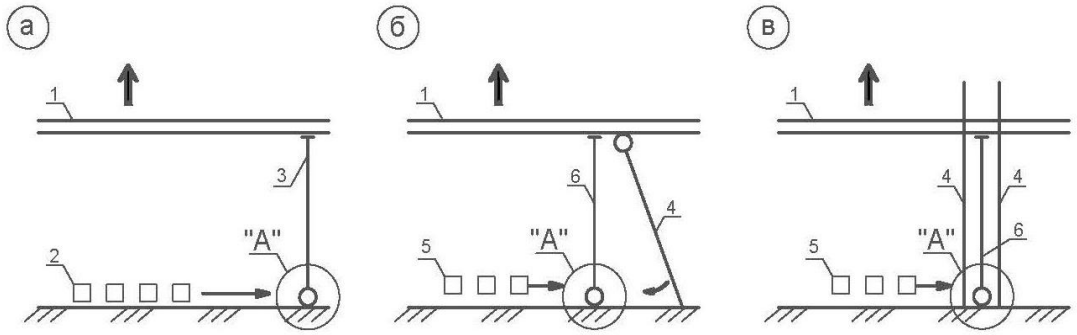

Рис. 1 Варіанти підйому покриття методом підрощування: а – зі спиранням на проектні колони, б – зі спиранням на стовпи підйомників без використання направляючих, в – зі спиранням на стовпи підйомників з використанням верти- кальних направляючих, «А» - зона підрощувальних робіт, 1 покриття, 2 – секції проектної колони, 3 – підрощена проектна колона, 4 – цільна проектна колона, 5- секції стовпів підйомників, 6 – підрощенний стовп підйомника.

підйому покриття зі спиранням на підрощувальні проектні колони показаний на Рис.2 . Бетонні колони були виконані з Т-образних сегментів. Вага кожного Т-образного сегмента складала 500 кг, загальна кількість змонтованих сегментів – 1000 шт. Перед монтажем кожного сегменту на його верхній грані укладали цементно-піщаний розчин (співвідношення 1:3), товщина прошарку 5/8'' (16,5мм) та металеві пластинні прокладки. Для підрощування кожної колони

були задіяні по чотири домкрати. Вантажопідйомність кожного домкрата 200тн. В процесі підрощування між внутрішніми боковими гранями змонтованих Т-образних сегментами утворювалась порожнина. В порожнині в процесі підрощування сегментів колон укладались арматурні стержні (по 14 стержнів на кожну колону). Після монтажу останнього Т-образного сегменту колони порожнина заповнювалась бетоном і після набуття бетоном розрахункової міцності виконувалось натягування арматурних стержнів. Безпосередній підйом кожного монолітного сегмента покриття тривав п'ять днів, в монтажних операціях були задіяні 30 робітників. З урахуванням часу, необхідного для набуття бетоном, укладеним в порожнинах сегментних підрощенних колон. розрахункової міцності і процесами по натягуванню арматурних стержнів, загальний час зведення покриттів на проектну висоту складав 35 днів. До недоліків справжньої технології підйому блоку покриття методом підрощування колон можна віднести шарнірну схему спирання колони на фундамент в процесі підрощування, значну працеємність та низьку продуктивність монтажного процесу, велику кількість монтажних операцій по підготовці до підрощування кожного Т-образного сегмента колон та утримання окремих блоків вагою 500кг під час встановлення на фундаменти в зоні підрощування, необхідність постійного контролю синхронної роботи 16 гідравлічних домкратів , задіяних в підйомі і утриманні сегментів колон в процесі їх підрощування, зростання навантажень на гідравлічні домкрати пропорційно кількості змонтованих Т-образних сегментів колон, малий робочих хід штоків домкратів.

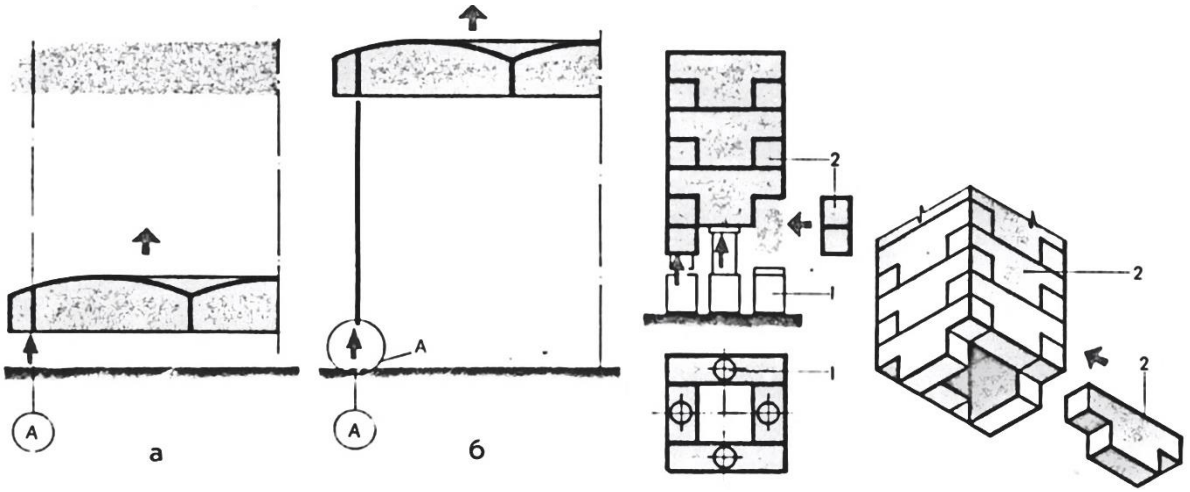

Рис.2 Підйом покриття методом підрощування зі спиранням на проектні колони: а – начальна фаза підйому, б – завершальна фаза підйому, «А» - зона робіт по підрощуванню колон, 1 – гідравлічний домкрат, 2 – «Т» - образний сегмент підрощувальної колони.

Підйом великопрольотного покриття методом підрощування зі спиранням на стовпи підйомників без використання направляючих (Рис.1, б) був виконаний при зведені покриття ангару розмірами 144 х 275м [9] з розбивкою на прольоти 60 / 24 / 60 м на авіазаводі у м. Києві, Україна. Покриття площею 39600 м^2 і масою 1100т піднімалось на висоту 24 м за 12 змін. В процесі підйому блоки великопрольотного покриття спирались на підрощувальні стволи гідравлічних підйомників ПГ-300. Підйом покриття зі спиранням на підрощувальні стволи підйомників показаний на Рис. 3.

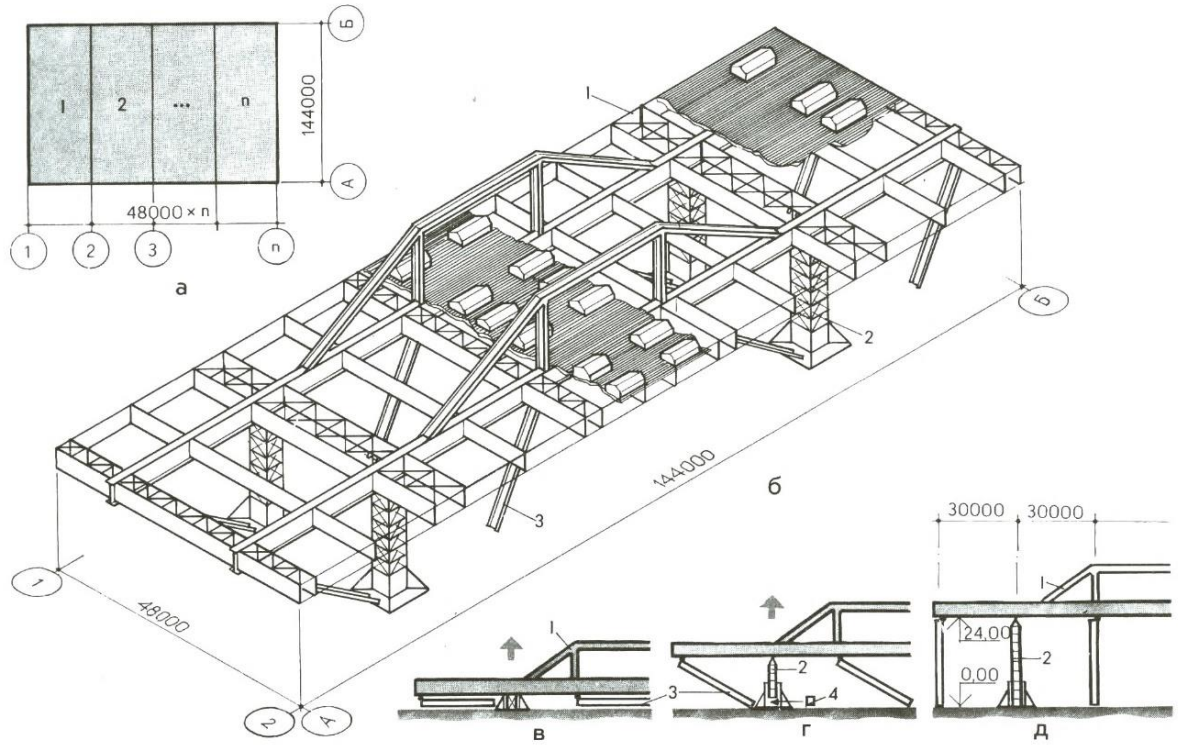

Рис. 3

Підйом покриття методом підрощування колон зі спиранням на стовпи підйомників без використання направляючих: а – розміри покриття в плані, б – загальний вигляд покриття в процесі підйому, в – початкова фаза підйому, г – проміжна фаза підйому, д – завершальна фаза підйому, 1 – покриття, 2 – підрощувальний ствол підйомника, 3 – проектна колона, 4 – секція ствола підйомника перед підрощуванням.

До недоліків справжньої технології підйому покриття можна віднести складність посадки блоків покриття на оголовки колон та стиковка піднятих блоків покриття між собою на висоті 24м. При цьому остаточна посадка блоків на проектній висоті виконувалась шляхом багатократних повторень циклів «підйом-опускання» в висотних межах 200 – 300мм з постійним регулюванням і контролем місць стикування великорозмірних блоків покриттів. З урахуванням того, що нижнє підрощування стволів підйомників ПГ-300 визначає схему взаємодії підрощувальних стовпів з фундаментами як «шарнірну», були впроваджені дороговартістні та

металоємні заходи для забезпечення вертикальності секцій стовпів підйомників в процесі їх підрощування. Для цього секції стовпів підйомників були спроектовані розмірами в плані 4,0 х 4,0м, а опорний вертикальний кондуктор кожної гідропідйомної установки висотою 10м мав нижній рамковий контур розмірами 16 х 16м [3,с.123–124]. Також, обовязковим було використання складного страхувального обладнання зі спеціальною системою домкратів, які контролювали конструктивно-технологічний блок в процесі його підйому.

За для забезпечення концентрації всіх процесів по підрощуванню стволів підйомників на нижніх проектних відмітках, контролю вертикальності піднімаємого покриття за рахунок направляючих, якими служать проектні колони, зменшення вартості і скорочення строків монтажних робіт, була розроблена технологія переміщення конструкції великопрольотного покриття на проектну висоту зі спиранням в процесі підйому на стволи підйомників, підрощування яких виконувалось між проектними колонами [10]. Варіант підйому покриття методом підрощування зі спиранням на стволи підйомників з використанням направляючих представлений на (Рис.1, в). Колони несучого каркасу споруди жорстко закріплені в фундаментах. Виконуючи функцію направляючих, колони забезпечують вертикальність підрощувальних стволів підйомників і переводять схему взаємодії «фундамент – підрощувальна колона» з шарнірної в усталену. В якості силових установок, виконуючих підрощування стволів підйомників і виштовхування конструкції покриття на проектну висоту служать гідравлічні домкрати ГД - 170/1120 [2 , с.124]. Крокoвий підйомник, до складу якого входить гідравлічний домкрат і загальний вигляд покриття, піднімаємого методом підрощування зі спиранням на стовпи підйомників з використанням направляючих, показані на (Рис.4) . Складові частини крокового підйомника і елементів піднімаємого покриття детально описані в [10].

Згідно з розробленим технологічним рішенням, одночасно з укрупненням конструктивно-технологічних блоків покриття на низьких риштуваннях виконують роботи по утворенню несучого поперечного каркасу будівлі з фундаментів, несучих колон і міжколонних зав’язків. При цьому, по всій висоті колон закріплюються направляючі – обмежувачі відхилення для секцій підрощувальних стволів підйомників.

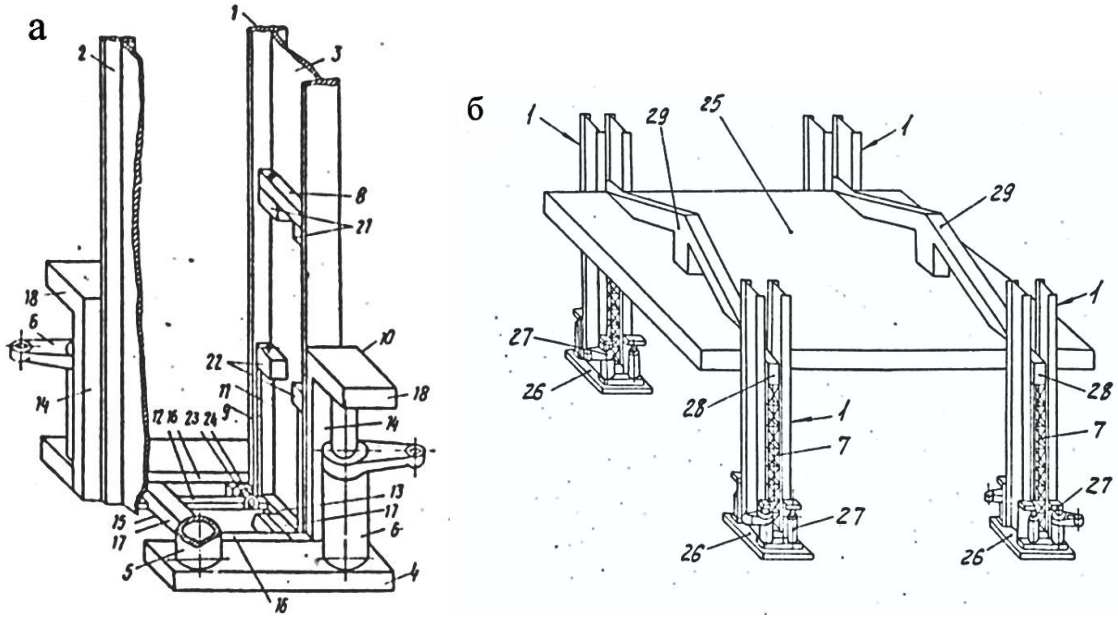

Рис. 4

Підйом покриття методом підрощування колон зі спиранням на стовпи підйомників з використанням направляючих: а – гідравлічний крокoвий підйомник, б – загальний вигляд покриття в процесі підйому.

Згідно з розробленим технологічним рішенням, одночасно з укрупненням конструктивно-технологічних блоків покриття на низьких риштуваннях виконують роботи по утворенню несучого поперечного каркасу будівлі з фундаментів, несучих колон і міжколонних зав’язків. При цьому, по всій висоті колон закріплюються направляючі – обмежувачі відхилення для секцій підрощувальних стволів підйомників. Зовні проектних колон на фундаментах встановлюють гідропідйомні установки. На колонах, в місцях верхньої точки виштовхування штоків гідродомкратів, закріплюють фіксатори підйому та подають в міжколон- ний простір оголовки стволів підйомників . Послідовність підйому покриття методом підрощування зі спиранням на стволи підйомників з використанням направляючих представлена на (Рис. 5). На нижніх відмітках зі спиранням на оголовки стволів підйомників і на риштування, формують несучу конструкцію покриття, виконують покрівельні роботи та монтаж технологічного покрівельного обладнання (Рис. 5, а). Після виконання 100% монтажних робіт по утворенню конструктивно-технологічного блоку покриття на низьких риштуваннях, штоки гідропідйомників виштовхують оголовки стволів підйомників на висоту, яка на 100мм більше висоти самих підрощувальних сегментів (Рис. 5, б). В простір між колонами на висотній відмітці нижньої грані піднятого оголовку підрощувального ствола підйомника

висувають фіксатори підйому, після чого опускають штоки гідродомкратів і , відповідно, передають навантаження від оголовків підйомників і конструктивно-технологічного блоку покриття на фіксатори підйому (Рис 5, в). Звільнені від навантаження, штоки гідродомкратів повертають в початкове положення. Після повного опускання штоків гідродомкратів, в міжколонний простір подають другу секцію ствола підйомника (Рис. 5, г). Штоки гідродомкратів виштовхують другу секцію ствола підйомника. Процес підйому другої секції ствола підйомника продовжується до моменту, коли верхня грань піднімаємої секції досягне висотної відмітки тимчасового закріплення оголовків підйомників фіксаторами підйому (Рис. 5, д). При подальшому висуванні штоків домкратів (50мм), навантаження від оголовка підйомника та конструктивно-технологічного блоку покриття передається на верхню грань другої секції підрощувального ствола підйомника. Це дозволяє повернути фіксатори підйому в початкове положення і виконати штоками домкратів підйом другої секції підрощувального ствола підйомника на висоту, аналогічну висоті підйому оголовка підрощувального ствола підйомника (Рис. 5, е). По аналогії з оголовком ствола підйомника, виконують операції по тимчасовій фіксації піднятої другої секції підйомника за допомогою фіксатора підйому (Рис. 5, ж). Звільнені від навантаження, штоки гідравлічних домкратів повертають в початкове положення. Цикл подачі в зону підрощування секцій стволів підйомника повторюють до моменту остаточного підйому покриття на проектну висоту. Після закріплення покриття на оголовках колон, виконують демонтаж секцій підрощувальних стволів підйомників. Демонтаж виконують у послідовності, зворотній процесу підрощування. На начальній фазі демонтажу штоки гідродомкратів опускають останню підрощену секцію ствола підйомника до висотної відмітки, на якій фіксатор підйому сприймає навантаження від передостанньої та вищерозташованих секцій підрощувального ствола підйомника (Рис 5, з). Потім штоки гідродомкратів опускають нижню секцію підрощувального ствола підйомника на фундаменти (Рис. 5, і). Згідно розрахунків, підйом покриття масою 1200тн на висоту 34 м може бути виконаний за 2 зміни.

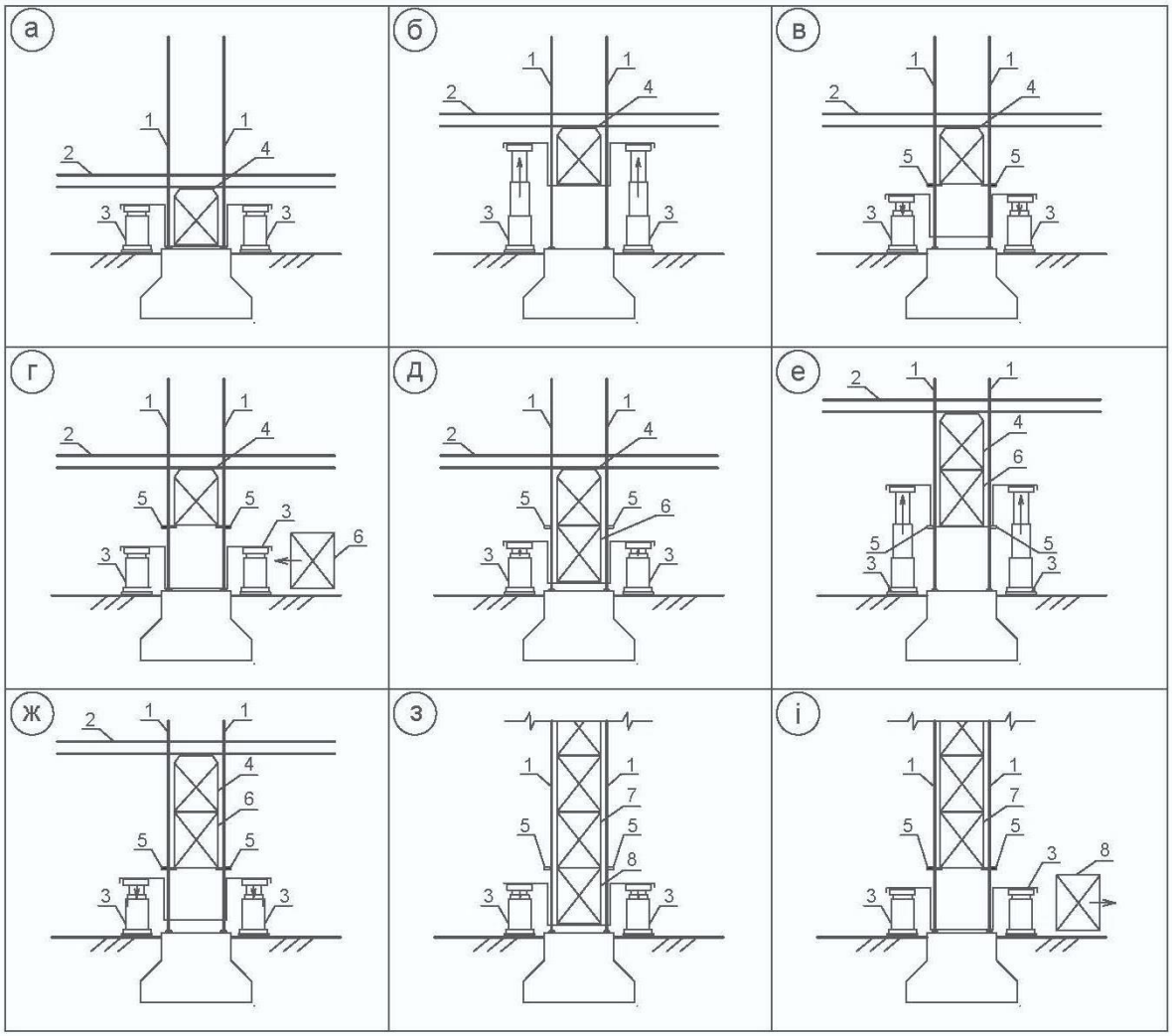

Рис.5 Послідовність монтажних операцій методом підрощування колон зі спирання на стовпи підйомників з використанням направляючих: 1 – проектна колона; 2 – покриття; 3 – крокoвий підйомник; 4 – перша секція ствола підйомника, 5 – фіксатори підйому; 6 – друга секція ствола підйомника, 7 – передостання секція ствола підйомника; 8 – нижня секція ствола підйомника.

При використанні методу підрощування колон зі спиранням піднімаємої конструкції покриття на стволи підйомників з використанням вертикальних направляючих, розміри будівельного майданчика можуть бути зменшені до розмірів конструктивно-технологічних покрівельних блоків, що піднімаються.

Запропонована технологія може знайти своє застосування, також, при заміні великогабаритного тяжкого обладнання у випадках, коли використання в цехах великогабаритних кранів неможливе Подальше вдосконалення технології підйому покриттів методом підрощування колон зі спиранням на стовпи підйомників з використанням направляючих пов'язано з розробкою універсальних підйомних модулів, які б забезпечували підйом конструктивно-технологічних блоків за умови підрощування монтажних колон всередині чи зовні проектних металевих чи залізобетонних колон різної конфігурації на висоту, більшу за 34 м.

Висновки

- на закладі аналізу відомих рішень безкранового підйому великопрольотних покриттів з застосуванням методу підрощування колон були визначені напрямки вдосконалення організаційно-технологічних і конструктивно -технічних рішень, а саме утворення несучого поперечного каркасу з фундаментів, несучих колон і міжколонних зв'язків в одному монтажно-технологічному етапі з укрупненням покриттів в монтажно-технологічний блок на низьких риштуваннях (висота до 2м), забезпечення вертикальності підйому покриття за рахунок направляючих, функцію яких виконують проектні колони, впровадження автоматизації процесів монтажу та демонтажу стволів підйомників за рахунок використання крокових підйомників, розташованих на фундаментах і взаємодіючих з проектними колонами для проміжної фіксації підрощувальних секцій підйомників.

- зменшення процесів, в яких задіяні монтажники під час підйому конструктивно-технологічного блоку покриття, до операцій по фіксації опорних ферм блоків покриття на оголовках проектних колон на завершальній фазі підйому;

- визначені перспективні напрямки використання крокових підйомників, взаємодіючих з проектними колонами в процесі підрощування стовпів підйомників, а саме підйом великогабаритного і важкого технологічного обладнання в просторах виробничих цехів, коли використання кранів технічно неможливе і переміщення покрівельних конструкцій з вмонтованим технологічним обладнанням на висоту, більшу ніж 34м з застосуванням нарощуваних несучих каркасів.

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EARTH SCIENCES

THE STRENGTHENING FOOD SECURITY THROUGH IMPLEMENTATION OF THE CONCEPT OF SUSTAINABLE AGRICULTURE

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Abstract

Food security is an important condition for the sustainable existence and development of society. Moreover, it is important both for an individual and for various social groups and society as a whole. The situation that has developed today in the world food market is the result of ineffective management of productive forces, in particular in agriculture, the consequences of the impact of natural and crisis phenomena occurring in the world, including military actions on the territory of Ukraine. All this presents our country with the task of providing the country's population with food and fulfilling its obligations to other countries regarding food supplies. This requires further study of food security issues, taking into account modern trends.

One of such mechanisms is increasing the importance of sustainable agriculture in the global world. And this is no accident, because thanks to the implementation of the principles of sustainability in agribusiness, the global consumer market receives products and raw materials for many industries.

Keywords: sustainable agriculture, food security, world food market, the implementation of the principles of sustainability in agribusiness, global consumer market.

Introduction. Food security is one of the most important conditions for the sustainable existence and development of society. Moreover, it is important both for an individual and for various social groups and society as a whole. Food security is a component of the economic and, in general, national security of any country.

Effective mechanisms for ensuring food security contribute to improving the social climate in society. The state of health of the population, the quality and duration of life, and its level, in general, are to some extent determined by the adequacy of the country's food supply. The standard of living of the population in a particular country depends on the level of development of industry, agriculture, the state of the public sector of the economy, and scientific and technological potential. But the main factor in this list is the immediate state of the domestic food market, the degree of its dependence on the global food market, the financial capacity of the population to meet their needs, and the ability to consume safe, high-quality and nutritious food. The food dependence of a country arises as a result of inefficient agriculture and the agri-food sector in general. Without ensuring food security, it is impossible to successfully solve economic and social problems, positively influence global processes, and defend the country's national interests. Solving the problem of food security is a priority of state policy, an object of scientific research, etc. The study of all aspects of food security, its forms, qualitative and quantitative characteristics, mechanisms and tools used is not only relevant from a scientific point of view, but also has practical significance in finding the best ways to further reform the industry and modernise it.

The current situation on the global food market is the result of inefficient management of productive forces, in particular in agriculture, and the effects of natural and crisis phenomena taking place in the world. Today, this list of influencing factors has been supplemented by the consequences of military operations on the territory of Ukraine, which is one of the leaders in the agricultural sector [1-3].

All of this poses complex macroeconomic challenges for Ukraine in terms of providing the country's population with food and fulfilling its obligations to other countries regarding food supplies. This necessitates further study of food security issues, taking into account current trends.

Materials and methods. The research was based on the learning of global reports and statistical data of the Food and Agriculture Organization of the United Nations, statistical data of the State Statistics Service of Ukraine, State Customs Service of Ukraine, national and regional reports.

Results and discussion. One of the mechanisms for addressing food security is to increase the importance of sustainable agriculture in the global world. This is no coincidence, as the global consumer market receives products and raw materials for many industries thanks to the implementation of sustainability principles in agribusiness. And most importantly, food and feed for livestock. Moreover, the demand for these resources is constantly growing and is under threat of shortage due to forecasts of an increase in the world's population [4].

Sustainable agriculture allows us to optimise this process, reducing the damage to the environment and future generations. This practice includes the transition to renewable energy sources, careful land use and the elimination of environmental pollution (Figure 1).

Figure 1. Use of renewable energy sources in sustainable agriculture

Sustainable agriculture is a complex of management decisions made by farmers and the data required for qualitative analysis provided by remote sensing technology (Figure 2).

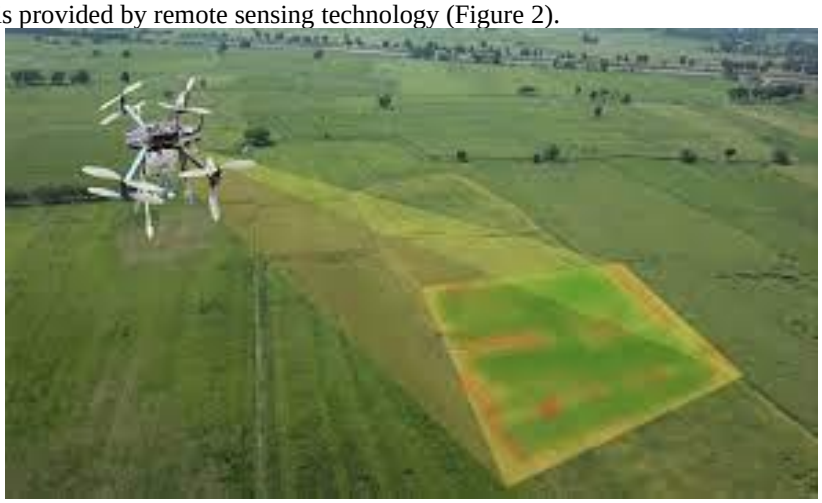

Figure 2. Use of remote sensing technologies in sustainable agriculture

The technologies used in sustainable agriculture contribute to stable and continuous production, which will ensure sufficient resources in the future.

According to research by the Food and Agriculture Organization of the United Nations (FAO), this practice includes five principles:

- improving the food chain;
- protecting and saving natural resources;
- improving the well-being and economic situation of people;
- promoting the resilience of ecosystems and communities;
- support for government initiatives and regulations.

Therefore, it is clear that the main goal of sustainable agriculture is to ensure food security, both in the short and long term. Other positive effects of sustainable agriculture include

- preservation of soil fertility and biodiversity;
- improving the environment, minimizing or preventing pollution;
- reduced use of non-renewable natural resources;
- economic development of rural areas and improvement of the quality of life of the rural population;
- raising environmental awareness and responsibility in society.

The most important aspect of sustainable agriculture is the ability to produce healthy food with minimal environmental damage through the rational use of each land plot without using intensive traditional technologies.

The concept of sustainable agriculture is based on three pillars: environmental, social and economic.

Ecological, or agroecological, is an environmental approach to management that reduces pollution and consumption of non-renewable natural resources.

Social, or socio-territorial, which is the basis for providing the world's population with sufficient food, fair employment and development for individual territories. Economic, which is the basis for the efficiency and profitability of agribusiness.

These three pillars of sustainable agriculture are closely interconnected. For example, fertilizer application tailored to the specifics of a particular plot of agricultural land can save farmers' resources and help protect the environment.

In order to reduce the negative impact on soils and, as a result, on the environment, sustainable agriculture uses nitrogen-fixing plants instead of fertilizers, and natural plant defenders instead of aggressive pesticides. Methods such as minimal or zero tillage, crop rotation, optimal irrigation, use of cover crops, permaculture technology, etc. are also used.

Crop rotation, which involved planting different types of crops in a certain sequence, has contributed to soil conservation and environmental sustainability. Soil compaction is minimized as the root systems of different plants differ from each other; the soil is saturated with nitrogen through the use of nitrogen-fixing plants;

pest control is improved for specific crop types; and soil depletion is reduced. In addition, the amount of chemicals used is reduced, and the supply of organic matter to the soil stimulates the activity of soil biota and reduces agricultural risks.

Efficient farming is usually carried out on irrigated land, which involves the use of significant water and energy resources. Sustainable development in agriculture is aimed at optimizing water and energy consumption. This is done by growing crops that are less demanding on water consumption and using modern irrigation methods. For example, drip irrigation, compared to furrow irrigation, uses 20-40% less water while increasing yields by 20-50%.

The use of cover crops in the off-season has allowed farmers to carry out soil erosion control measures. If used as green manure, they contribute to the accumulation of organic matter in the soil and reduce the amount of fertilizer used. Such plants fight weeds and retain moisture in the soil.

In contrast to regular ploughing, minimal or no-till prevents soil loss due to wind and water erosion. In addition, this technology prevents soil compaction and minimizes greenhouse gas emissions, which contributes to environmental sustainability.

Sustainable weed control methods are aimed at preserving natural resources by eliminating chemicals and implementing environmentally friendly methods.

Permaculture, one of the technologies of sustainable agriculture, artificially creates ecosystems with their diversity and stability. This contributes to the development of sustainable agriculture by reducing waste, using renewable sources, combating pollution and increasing soil fertility in ways that are safe for the environment.

In addition to the practices described above, sustainable agriculture uses other practices. These include biodynamic and organic farming; integration of livestock and crop production; intercropping; mulching; conservation tillage; use of biofuels and zero-emission transport, etc.

The choice of technologies and methods used to support sustainable agricultural production depends on the particular agricultural producer, its specifics and the crops it grows.

Like the Concept of Sustainable Agriculture, sustainable agriculture itself has three components of sustainable development: economic, environmental and social.

The economic benefits include:

- reduced costs due to the use of precision farming methods;
- ensuring food security by increasing crop yields;
- energy savings due to the avoidance of fossil fuels (natural resources) whenever possible.

The benefits of the environmental component of sustainable agricultural production are as follows:

- protection of natural ecosystems;
- preservation of biodiversity, creation of conditions for animals close to natural ones;
- soil conservation, prevention of erosion and depletion;
- minimizing water and air pollution;
- conservation of non-renewable natural resources.

The social component of sustainable agriculture has characterized by:

- increase in wages;
- reduction of social inequality;
- improved public health due to reduced chemical pollution of soils and agricultural raw materials.

However, sometimes the benefits of implementing sustainable agriculture are accompanied by certain difficulties for agricultural producers, such as the lack of sufficient research, initiatives and support from government authorities at various levels, and sometimes insufficient logistical support.

An important component of implementing sustainable agriculture is managing its resources, namely by preserving natural resources: soil, water, air, etc.

Soil is an essential medium for plants. Therefore, effective agriculture is not possible on poor or unsuitable land. Sustainable agriculture can reduce soil erosion and restore soil fertility. It preserves soil fertility by using polyculture, crop rotation, ecological fertilizers and fertilizers of natural (animal) origin, etc. This provides the necessary amount of nutrients, as well as the means to combat plant diseases and pests.

Soil conservation is an important part of sustainable agriculture, as it addresses the problem of topsoil loss, primarily by preventing erosion. As mentioned above, sustainable agriculture practices include the use of cover crops, the construction of windbreaks and minimal tillage.

Successful management of water conservation in sustainable agriculture is also a key to its effective operation. In conditions of low precipitation, artificial irrigation is the only way to conduct agricultural activities. As the need for water resources will only increase in the future, water management requires special attention and responsibility.

The use of sustainable agriculture practices allows us to:

- eliminate soil salinity through desalination;
- prevent leakage of fertilizers that pollute the soil and cause sedimentation in water bodies;
- optimize water use through smart irrigation, rainwater harvesting and reuse of resources;
- prevent the destruction of habitats within the catchment areas;
- select plants that are resistant to drought;
- consider the need to plant in atypically dry years (based on historical data to predict weather trends).

The modern agricultural sector is dependent on oil-based fuels, which are a non-renewable source. The only way to overcome this dependence is to use energy-saving technologies in agriculture that use renewable energy sources. The most promising areas of development of the industry as a sustainable one are:

- the use of highly efficient solar-powered irrigation systems or biofuel equipment;
- growing crops for alternative fuels;
- use of biomass to convert it into bioenergy;
- use of wind and solar energy for the needs of agricultural enterprises.

Clean and fresh air is essential for human life. However, almost all agricultural activities pollute the

atmosphere with chemicals, dust, fossil fuel emissions and methane, which is produced in large volumes in livestock production.

According to the results of the analysis of the state of the atmospheric air, in 2021 alone, agriculture accounted for more than 10% of all greenhouse gas emissions in the world on average. Compared to 1990, this indicator increased by 12%.

Sustainable agriculture provides an opportunity to improve air quality by reducing dust through reduced tillage, the use of cover crops and agroforestry methods, and the installation of windbreaks of plantations.

Recently, technologies using satellite and space-based observation sources have been widely used.

Sustainable crop production, as one of the sectors of agriculture, is not just a stable business for agricultural producers. It is also a specific challenge for every participant in the food chain responsible for food security.

The use of new technologies in sustainable agriculture allows for continuous monitoring of production and facilitates its management. One of the most advanced methods is remote sensing. This method is a reliable source for analysing and forecasting crop development, quality and productivity of agricultural land, resource use, biodiversity control, etc. (Figure 3) [5].

Figure 3. The stage of using remote sensing technology in sustainable agriculture

Programmes and platforms used in this technology allow for efficient management of crops and production resources. One of the most convenient online tools for implementing precision farming methods that contribute to the development of sustainable agriculture is the EOSDA Crop Monitoring platform. This application allows for the efficient use of fertilizers and other agrochemicals (e.g., plant protection products) by applying zoning and changing application rates (Figure 4).

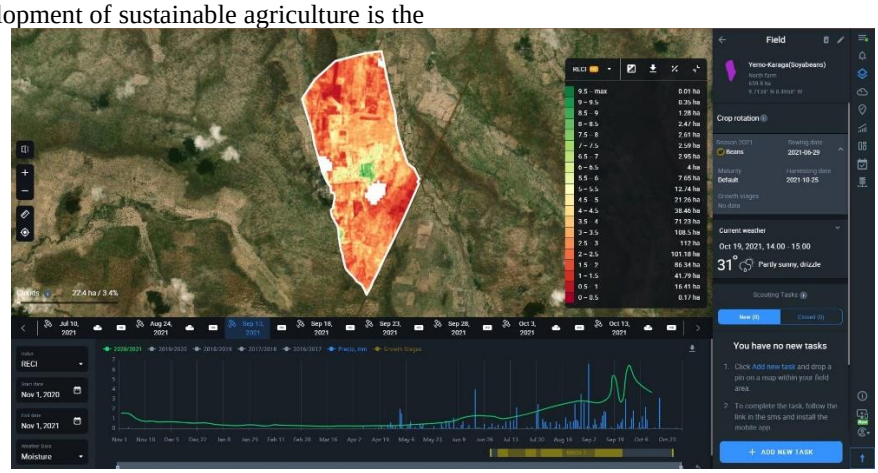

Figure 4. Example of variable rate fertilizer application

The technology is based on dividing the field into several zones. Areas with healthy vegetation are shown in green, while critical areas are shown in yellow and red. By differentiating the required rates and treating the green and red zones accordingly, farmers can reduce the use of agrochemicals. This will save financial resources and improve the environment.

Efficient use of water can also be achieved through the use of programs that take into account soil moisture data. By monitoring these parameters, you can provide the farmer with timely information about possible problems that may be caused by waterlogging or plant water stress. It is possible to ensure the healthy development of crops and preserve the harvest by taking measures to combat the lack or excess of moisture. By tracking the weather forecast and monitoring for possible rainfall, users of this app can adjust irrigation, which will save water resources.

Monitoring programs also provide up-to-date information on the condition of crops and allow us to respond quickly to any deviation from the standard values for the current stage of plant development.

Recently, another effective mechanism for managing sustainable agricultural resources has been used – agro-scouting. Agro-scouting involves collecting information from the field (in the form of specified parameters) to control the quality of work performed (tillage, irrigation, harvesting, etc.), determine the condition of crops (vegetation stage, activity, health, presence of diseases and pests), and develop technical specifications for field treatment.

Unfortunately, Ukraine does not have a developed institution of agro-scouting. However, with the support of foreign investors and partners, including the USAID program, work is underway to establish agro-scouting centers to provide agricultural producers with a range of services. The purpose of these centers is to optimize agricultural technologies, improve the productivity and quality of fruit and berry products, and enhance the professional knowledge and practical skills of young specialists of specialized higher education institutions (HEIs) in line with the needs of the agricultural market.

The scouting function helps to reduce fuel consumption and emissions by reducing the need for field visits. Regular field inspection is particularly difficult when the farmland under control is large in area or located in different places. Remote monitoring of crop condition greatly facilitates this process, as field scouting becomes necessary only when a problem is detected through specific deviations in the values of the monitored indicators. This procedure identifies critical areas of the field for additional inspection. This saves travelling time and reduces fuel consumption. Upon arrival at a specific critical zone, a scouting specialist can quickly identify plant diseases, pest infestations, excessive weeds, etc. Based on the results of the scouting reports, the agricultural producer can choose the most effective plant protection product for the affected areas.

Another effective tool for eliminating errors in farm management planning is the so-called EOSDA Crop Monitoring work logbook. This form of management allows you to store information about all completed and planned field operations. This will help to eliminate the possibility of errors in production, allows you to track changes in plant development after each procedure, storing all the necessary data in one place (Figure 5).

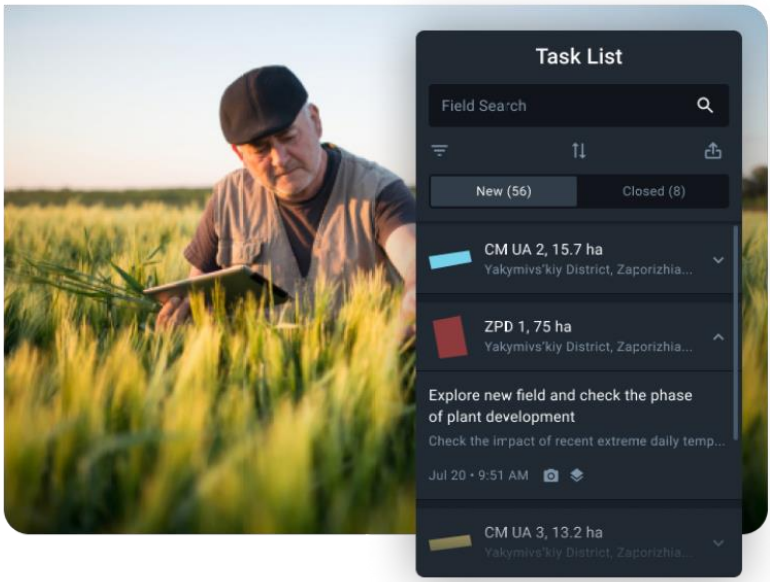

Figure 5. An example of the use of agro-scouting in sustainable agriculture and keeping a logbook [5].

In addition to the existing capabilities of EOSDA, the program can use patented EOS SAT imagery to conduct analytical analysis based on satellite data. This allows for more efficient use of modern remote sensing technologies for the development of sustainable agriculture [7-9].

Conclusion. Sustainable development of society in the global world is impossible without any security, especially food security. The provision of food to the population and the environment are an important condition for human life and activity.

Today, sustainable agriculture is becoming increasingly important in the global world. Implementation of sustainability principles in agribusiness allows to optimize this process, reducing environmental damage through transition to renewable energy sources, careful land use and elimination of environmental pollution.

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MATHEMATICS

ON SOME WAYS FOR CALCULATION DEFINITE INTEGRALS

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Abstract

One of the classical problems is the calculation of the definite integrals. The specialists encounter very often the calculation of definite integrals. Traditionally, to calculate some definite integrals were used integral sums as the rectangular method, trapezoid and Simpson methods etc. By using that all methods have their own advantages and disadvantages. Currently, experts are trying to construct more accurate methods with the improved properties. Therefore, construction of methods with the improved properties is always relevant. Following what was said, here is a suggestion for a new way for calculation of definite integral. For this aim offered here to use the some relationship between the both ODEs and definite integral. And suggested to use the intersection of definite integrals with the initial-value problem for the Ordinary Differential Equations. In the first time this idea was used by Euler in the result of which appeared Euler's explicit method. Here, this idea has been generalized and has constructed more general methods for the calculation of definite integrals. And the advantages of these methods were also shown. The advantages of the suggested methods here have been illustrated by using some simple examples.

Keywords: Initial-value problem for ODEs, definite integral, stability and degree, advanced and multistep methods, methods with the fractional step-size.

Introduction.

With the calculation of the definite integrals the specialists have met in the investigation of the orbit of the selection body, by taking into account that the orbit of these bodies are described by using ODEs. Therefore, many scientists have studied the initial-value problem for the ODEs. Many famous scientists, such as Newton, Cattes, Euler, V.I. Krilov, Simpson, Adams, Sobolev, R. Aliyev, Bakhalov, Imanova, Ibrahimov and etc. have studied this problem. Some of them have constructed methods for calculation of definite integrals and others have suggested some ways for constructing the methods with the new properties. Here both directions are used to calculate the definite integral (see for example [1]-[7]). And also used comparision of the proposed here, methods with the known.

Let us to consider the following definite integral:

$$y(b)=\int_a^b f(x)dx, \qquad \textbf{(1)}$$

the continues function f(x)-is define on the segment [a,b]. For the calculation of the integral (1), let us to devote the segment [a,b] into N-equal part by the mesh-points $x_{i+1}=x_i+h\ (i=0,1,\ldots,N)$. In usually the integral (1) is calculated by some quadrature formula, which can be presented as follows(see for example [8]-[12]):

$$\int_a^b f(x)dx=h\sum_{i=0}^{n}\beta_i f_i+R_n, \qquad (2)$$

here R_n –is reminder term $\beta_i(i=0,1,..,N)$ are the coefficients of the formula (2) and real numbers, $x_0=a$ and $x_N=b$. In usually for the construction of quadrature formula considered the case $N=mk$, here m-is the amount of the subintervals, but k-amount of the mesh-points, participated in the construction of the method of type (2). For example, if $N=mk$, then for the calculation of integral one can constructed the following method:

$$\int_{x_0}^{x_N} f(x)dx=\sum_{i=1}^{m}\int_{x_{(i-1)k}}^{x_{ik}} f(x)dx, \qquad (3)$$

By using some quadrature formula in the equality of (3) one can write:

$$\int_{x_0}^{x_N} f(x)dx\approx h\sum_{i=1}^{m}\sum_{j=0}^{k}\beta_j f(x_{i+j}). \qquad (4)$$

It is obvious that in different segments the coefficients can be taken differently. In this case formula (4) can be written as follows:

$$\int_{x_0}^{x_N} f(x)dx=h\sum_{i=1}^{m}\sum_{j=0}^{k}\beta_j^{(i)} f(x_{i+j}). \qquad (5)$$

One can easily understand that, when using the method (5), the question arises: when the errors obtained in the application of the method (5) be limited?

The answer to this question can be found in the following section.

§1. On the estimation of the errors receiving in using formula (5).

For the investigation of the errors, which arises in the application of multistep method to calculation of the definite integrals, let us to consider the following equality(see for example [13]-[17]):

$$y(x)-y(x_0)=\int_{x_0}^{x} y'(x)ds. \quad (6)$$

Let us to consider the following initial problem:

$$y'(x)=g(x,y),\quad y(x_0)=y_0,\quad x_0\le x\le X. \quad (7)$$

If to use the equality (6) in ordinary differential equation, then receive the following:

$$y(x)=y(x_0)+\int_{x_0}^{x} g(s,y(s))ds. \quad (8)$$

It is easy to understand that the integral equation (8) and initial-value problem (7) are equalivent. And also it is known that for the numerical solution of problem (1), one of the suitable method is the multistep method, which can be presented as follows:

$$\sum_{i=0}^{k}\alpha_i y_{n+i}=h\sum_{i=0}^{k}\beta_i g_{n+i}, \quad (9)$$

here $g_m=g(x_m,y_m),\ m=0,1,2,\ldots$.

Suppose that the continuous solution of problem (7) has defined on the segment [x_0, X], but the function $g(x,y)$ has defined in some closed set and there has the continuous partial derivaties up to p, inclusively. And also have used here some denotion, for example, y_i is the approximately values of the solution of the problem (7) and $y(x_i)$ is the corresponding exact values. The mesh-points are denoted by the $x_{i+1}=x_i+h$, here h>0 is the step-size. It should be noted that Multistep method applied to the calculation of the definit integrals turns into the following form:

$$y_{n+k}=y_n+h\sum_{i=0}^{k}\beta_i g_{n+i},\ n=0,1,..,N-k. \quad (10)$$

As is known for the convergence of the method (9), it's stability is necessary and sufficient (see for example [18]-[25]).

Definition1. Method (9) called as the stable if the roots of the following polynomial $\rho(\lambda)=\alpha_k\lambda^k+\alpha_{k-1}\lambda^{k-1}+\ldots+\alpha_1\lambda+\alpha_0$ located in the unit circle on the boundary of which there is not multiply root.

Noted that, for the comparison of the numerical methods in often are used the conception of degree, which can be defined as follows.

Definition 2. The integer value p called as the degree for the method (9), if the following takes place:

$$\sum_{i=0}^{k}(\alpha_i y(x+ih)-h\beta_i y'(x+ih))=O(h^{p+1}),\ h\to 0. \quad (11)$$

It is not difficult to show that, method (10) is stable. The characteristics polynomial $\rho(\lambda)$ of the method (10) can be presented as follows:

$$\lambda^k-1=0. \quad (12)$$

All the roots of this equation are on the unit circle and differ from each authors, because method (10) is stable. Noted that method (10) remembers of Adams methods, but they are not one and the same. And it is easy to understand that in the set of roots of the equation (12) in a complex roots are always presents for the $k\ge 3$ absolute values for which are equal to one, therefor method (10) is stable. The coefficients of the method (10) satisfies the conditions imposed on the coefficients of the method (9), which fundamentally has investigated by Dahlquist. The named conditions can be presented as follows:

A. The coefficients $\alpha_i,\beta_i(i=0,1,..,k)$ *some real number and* $\alpha_k\ne 0$.

B. The characteristic polynomials:

$$\rho(\lambda)\equiv\sum_{i=0}^{k}\alpha_i\lambda^i,\ \upsilon(\lambda)\equiv\sum_{i=0}^{k}\beta_i\lambda^i,$$

have not common factor different from constant.

C. $\delta(1)\ne 0$ and $p\ge 1$.

It is clear that the method (10) can be received from the method (9) as the partial case, but in the construction of some methods the coefficients $\alpha_i(i=0,1,..,k)$ is selected so that , the polynomial $\rho(\lambda)$ does not have complex roots. Hence the preferred use of method (9) in solving many applied problems. Therefore, let us consider application of the method (9) to calculation of definite integrals.

§2. Application of the method (9) to calculation of definite integral (1).

Noted that the volume of the computational work in the application of the method (10) to calculation of definite integrals by using equality of (5) will be less than errors, receiving in using of the method (9). But method (9) is more general, than the method (10) and therefore one can be constructed the new multistep methods with the new properties, which can provide a reduction in error when using method. For this, let us to consider application of the method (9) to calculation of definite integral (1). For this, here proposed to use equalities (6)-(8). By using relationship between of these equalits, one can be applied method (9) to calculation of definite integral (1). In first, let us to solve problem (7) to use explicit Euler method. In this case receive:

$$y_{i+1}=y_i+hg(x_i,y_i). \quad (13)$$

It is clear that in the calculation of the value y_{i+1} by the method (13) are not arises any difficult. But if the method (13) to change by the following method:

$$y_{i+1}=y_i+hg(x_{i+1},y_{i+1}), \quad (14)$$

then in the application of this method, arise some difficulties, which related with the solving of nonlinear algebraic equations (see for example [26]-[30]). Difficulty of this problem in using of this method is due to the fact that this method is implicit. If the function $g(x,y)$ is depending of $y(g(x,y)=f(x))$, then above noted defect will not occur. It follows from here that, if we applied method (9) to calculation of the integral (1), then are not arises above mentioned difficults. Thus receive that $y_N=y_b$. Many specialists proposed constructed more accurate methods for calculating of the integral (1), in the results of which appeared the new methods that used the higher derivatives of the

function of f(x) in the application of calculating of definite integral (1). Some authors have suggested using the calculating function, which is written under the integral sign. For example methods of Gauss, Chebishev, Ibrahimov, Imanova and etc. (see for example [31]-[36]). Here by the continue of these ways have recommending to use the hybrid methods. For the shown the advantages of these methods, let us to consider the following methods:

$$y_{n+1} = y_n + hf(x_{n+1/2});\ y_{n+1} = y_n + h(f(x_n) + 3f(x_{n+2/3})/4, \tag{15}$$

$$y_{n+1} = y_n + h(f(x_{n+1}) + 3f(x_{n+1/3}))/4,\ \ y_{n+1} = y_n + h(f(x_{n+1/2+\alpha}) + f(x_{n+1/2-\alpha}))/2,\ \alpha = \sqrt{3}/6. \tag{16}$$

And now let us to consider comparison of these methods. The first method in (15) is the midpoint method which is explicit, stable and has the degree of p=2. As is known if in the method of (9) to put k=1, then one can be constructed explicit and stable method with the degree $p_{\max} = 1$, which can be presented as follows:

$$y_{n+1} = y_n + h(f(x_n)),\ R_n = \frac{h^2}{2}y''(x_n) + O(h^3). \tag{17}$$

If to compares midpoint and explicit Euler methods, then receive that in the application of the midpoint method arises difficult related calculation of the value $y_{n+1/2}$. However, one can be freed from this disadvantages by using replacement h by 2h, in this case receive the following method:

$$y_{n+2} = y_n + 2hf(x_{n+1}), \tag{18}$$

which is usually called as the two-step method. This method is stable and has the degree p=2. Noted that this result to corresponding Dahlquist's law. The second method of (15) is the hybrid method, which is stable has the degree p=3. And in this method participate the values of the solution of the problem (8) at the 3 (three) points, but in second method at the 4 (forth) points. Noted that the first method in the (16) also has used information about of the solution our problems at the 4 (fourth) points. Thus receive that the methods in the (16) are used the same value of information about the solution of the solved problem. But the first method in (16) has the degree p=3, and the second method has the degree of p=4. If to comprise methods (15) and (16) by taking into account they degree, then receive that the second method in the (16) is best. Noted that the second method in (15) is explicit, but the first method in (16) is implicit. By using these methods one can be constructed predictor-corrector methods. However, the best combination of these methods is to find the half-sum above mentioned methods, which will be more exact than the results receiving by using the second method in (15) and the first method (16). These methods are bilateral or two-sided. Therefor the value receiving by using half-sum of these methods are more exact. Thus, here have constructed the 4(four) methods and have given some ways for it's application to solve some problems. Noted that by using above described sequences of operations one can constructed step by step algorithm for solving problem(1). Similar research has been carried out with many authors (see for example [37]-[41]). For the illustration of the receiving here results, let us consider to the following section.

Numerical results.

There are some ways for solving above named question. One of these way is the using some tables for the tabulated and comparison the receiving results. It should be noted that this method for the comparison of the receiving results are more clear. Let us consider to solve following simple example:

$y' = \cos(x),\ y(0) = 0,\ x \in [0,1],$ The exact solution for which is $y(x) = \sin(x).$

Noted that one of the known method for calculation of definite integrals is the Simpson

method, which can be presented as:

$$y_{n+2} = y_n + h(y'_{n+2} + 4y'_{n+1} + y'_n)/3. \tag{19}$$

By using methods with the fractional step-size receive more perspective methods. For the illustration of this let us to write method of (19) in the following form:

$$y_{n+1} = y_n + h(y'_{n+1} + 4y'_{n+1/2} + y'_n)/6. \tag{20}$$

This method is stable and has the degree p=4, which can be comparison withthe methods (15) and (16). Let us remember that for receiving an acceptable result in usually are use the reducing (decreasing) of the step size. By using this idea, here has considered application of the Simpson method to calculation of integral (1) with the step size of h and h/2. Results have been tabulated in the Table 1.

Table 1.

Receiving results for step size $h = 0.1$

Step size	Variable	Error for the method (19)	Error for the method (20)
$h = 0.1$	0.2	0.11E-06	0.69E-08
	0.3	0.10E-06	0.10E-07
	0.4	0.21E-06	0.13E-07
	0.5	0.21E-06	0.16E-07
	0.6	0.31E-06	0.19E-07
	0.7	0.30E-06	0.22E-07
	0.8	0.39E-06	0.24E-07
	0.9	0.38E-06	0.27E-07
	1.0	0.46E-06	0.29E-07

The receiving results here correspond to the theoretical. It is not difficult to understand that the hybrid methods are more exact than the implicit methods of multistep types. And methods given by using derivatives of the required solutions can be applied to solve problems in a simplified form. For the demonstrating of this let us consider application method (19) and (20) to solve following problem:

$$y' = (4\exp(-y) - x^3)/3 + \frac{4}{3}\int_1^x \frac{s^2}{x}\exp(y(s))ds,\ 1 \le x \le 2,\ y(1) = 0,1 \le x \le 2. \tag{21}$$

Exact solution for this problem can presented as: y(x)=lnx.

The results of methods (19) and (20) receiving in the application them to solve problem (21), have tabulated in table 2.

Table 2.

Receiving results for step size $h = 1/32$.

Step size	Variable	Error for the Simpson's method	Error for the method (20)
$h = 1/32$	1.250	0.85E-07	0.63E-09
	1.500	0.23E-05	0.10E-06
	1.750	0.60E-05	0.27E-06
	2.000	0.77E-05	0.32E-06
	1.031	0.29E-05	0.25E-07

Conclusion.

It is known that there are many papers dedicated to calculation of definite integrals. In these paper have considered for its constructed some methods or it's modification to calculation of definite integrals. It is clear that for the comparison of these methods it usually has used its exactness. Noted that in often for this aim are used the asymptotic equalities. Many specialists are using this asymptotic equalities for the sufficiently small step size. In this case the value of the computational works also increases, but in using bilateral methods such cases do not arise. Therefore here decided to recommend to use above described ways think many processes solving mathematical models, which described the investigation as the from the different fields of natural sciences. It should be noted that the construction and application of quadrature formula is more difficult than the using of a class of methods constructed to solve the initial-value problem for the ODEs of the first order (see equalities (6) and (8)). But as was shown here, that in the classes of methods which have investigated here, there are methods with the different properties. Consequently, to apply all the methods of type (9) to calculation of defining integrals in the case k>3 cannot be taken as the suitable. Here also has given the some recommendation for the application of the using here methods. The result received here is new, therefore that will be fined its followers.

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PARASITOLOGICAL SCIENCES

DIAGNOSIS OF INTESTINAL PARASITOSIS IN LARGE FELINES FROM BUCHAREST ZOO

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Abstract
The study was carried out on several animal species from the collection of the Bucharest Zoo in the period 2015-2020 and the evolution of parasitic infestations among others was studied. In the first phase, the rate of intestinal endoparasites was monitored in large felines, where the infestation rate was 41.6% in some cases, correlating with progressive weakening and digestive disorders. According to the results, Toxasacaris leonina infestation was prevalent especially in tigers.
Keywords: large felines, tigers, endoparasitosis, Toxascaris.

Introduction

The pathology of captive animals involves a particular approach strictly conditioned by the way they are kept. Space restriction , feeding way, disclaim of territorial behaviour and the impact of the visitors are all factors that lead captive animals to develop a specific pathology (Hasslinger, 1985).

Big cats of genus *Panthera*(tiger,lion,jaguar) and *Felis*(cougar, lynx) exhibit good adaptability in zoos, the proof being found in their prolificacy(Atanaskova, Gonzales 2007). They are found in all colections in zoos in the country in a large enough number. Clinical and laboratory examinations conducted by Micu et all. indicated long periods of *Toxascaris leonina* infeststions , many of them due to contamination with infested eggs in the living environment.

Materials and methods

The study was perfomed by laboratory and clinical examinations during march 2015- august 2020 on five species of big cats:*Pantera tigris*(tiger), *Pantera leo*(lion), *Pantera onca*(jaguar), *Felis concolor*(cougar) and *Felis lynx*(lynx) from the Bucharest Zoo collection.

24 animals werw under examination among eleven (11)Siberian tigers, four(4)jaguars, three(3)cougars, three(3) lynx, two(2)lions and one Bengal tiger, their feces were collected for coproparasitary examination. The coproparasitary examination used qualitative methods such as Willis, Andersen sucrose, Perez Fontana and quantitative such Mini-Flotac and McMaster.It aimed to identify forms of contamination (eggs, oocysts,cysts)and also adult parasites removed spontaneously or after treatement. Infected animals were subjected to antihelmintic tratement with benzimidazole derivats, praziquantel and levamisole. Comments upon reinfection possibilities and resistance of invasion forms led to the establishment of an ongoing program of periodic coprologic examinations and prophylactic treatements

Results and discussion

Out of the total number of animals,10(41,6%) were identified with intestinal parasitic infestations(tab.1)

Tab 1.

Prevalence of enteric parasitosis

Felines examined	Felines infested	%
24	**10**	**41,6**

Incidence in the species was as follows:4 siberian tigers – 40%, 2 cougars- 20%, 2 lynx-20%, 1 lion- 10% and 1 jaguar- 10%. In all these cases, infestations with *Toxascaris leonina*, *Strongyloides* sp. and *Isospora* sp. were identified(tab.2)

Tab 2.

Incidence of parasitic infestations by species

No. total of infested felines	Species infested					
	Siberian tiger	Bengal tiger	Puma	Jaguar	Lion	lynx
10	Nr. %	Nr. %	Nr. %	Nr. %	Nr. %	Nr. %
	4 40	0	2 20	1 10	1 10	2 20

Infestation with *Toxascaris leonina* was met in 5(50%)cases and its level was 500-1000 epg (eggs per gram). Infestation with *Isospora* sp.was met in 3 (30%)cases and the level was 200 epg(eggs per gram). Infestation with *Strongyloides* sp. was met in two (20%) cases and it was of 200 epg(eggs per gram).(tab.3 and 4)

Tab 3.

Incidence of *Toxascaris leonina*

Total no. felines infested	Felines infested with *Toxascaris leonina*	
10	No.	%
	5	50

Tab 4.

Incidence of *Isospora sp.*

Total no. felines infested	Felines infested with *Isospora sp.*	
10	Nr.	%
	3	30

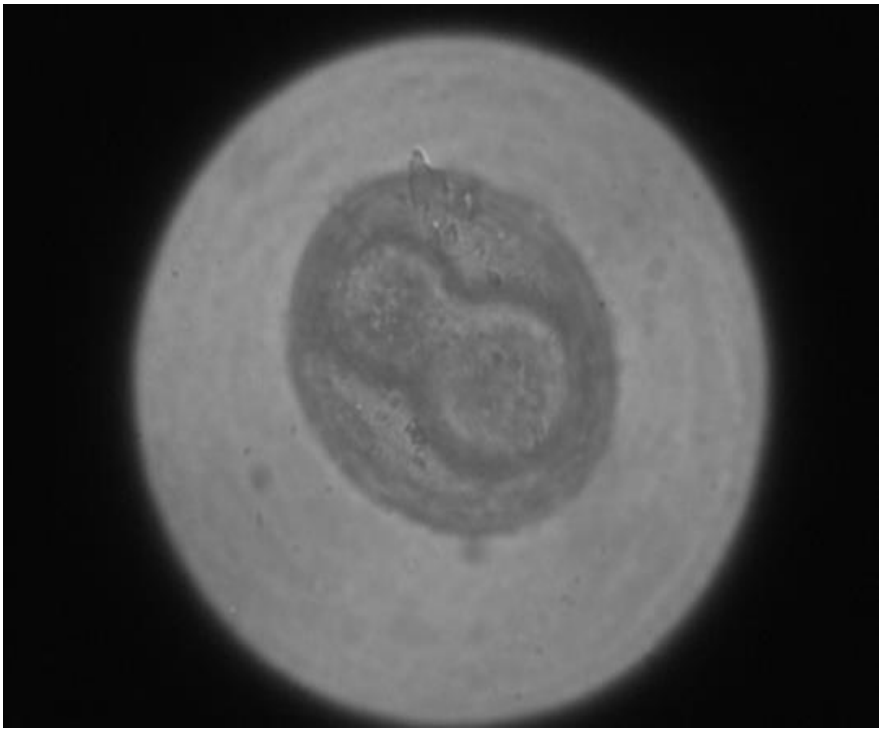

Fig. 1 Toxascaris leonina- egg

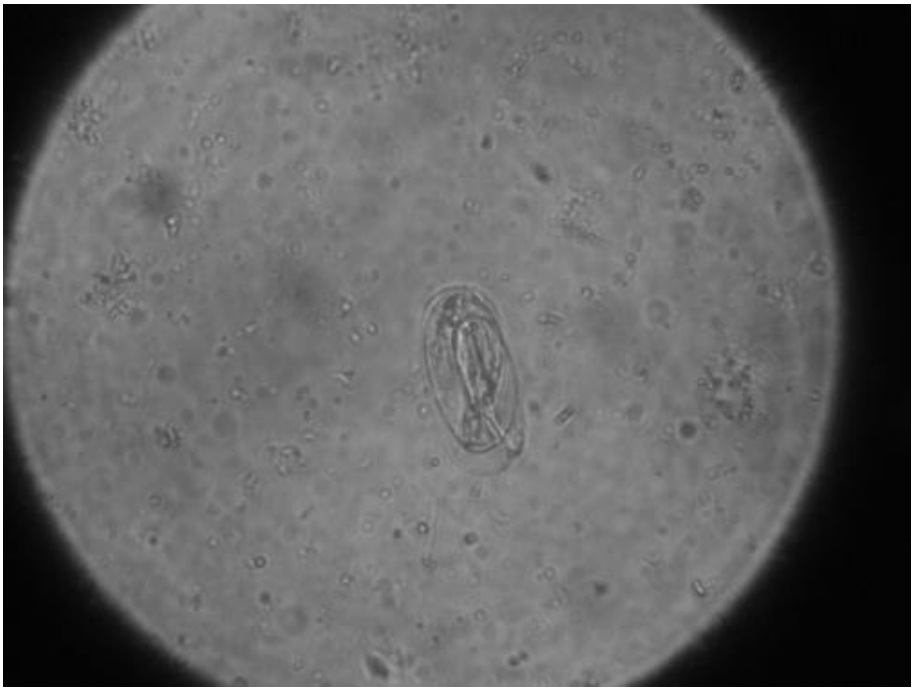

Fig. 2 Strongyloides stercoralis-egg

Conclusions

1. The incidence infestations in big cats from the Bucharest Zoo collection was of 41,6 %

2. Infestatios with Toxacaris leonina (50%), Strongyloides sp. (20%), Isospora sp(20%).

3. The degree of infestation was of 500-100 epg with Toxascaris leonina, 200 epg with Strongyloides sp. and 200 epg with Isospora sp.

4. Curative and prophylactic treatements were based on benzimidayole derivats(fenbendazile and mebedazole), levamisole and praziquantel.

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PEDAGOGY

GLOBAL YOUTH CULTURE: A COMPARATIVE ANALYSIS OF INFLUENCES, TRENDS, AND IDENTITIES

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Abstract

The investigation into youth culture has been a longstanding pursuit within the realms of psychology and sociology, stemming from the foundational works of G. Stanley Hall and Talcott Parsons in the early 20th century. The multifaceted nature of youth culture has gained increasing attention in contemporary academia, evident in the proliferation of journals and organizations dedicated to cultural matters. This study embarks on a comparative analysis of youth culture in Albania and Bulgaria, recognizing the significance of understanding global diversity through cultural variations. The methodology employs a secondary research approach, synthesizing insights from existing literature to explore the intricate dynamics of youth culture in both countries. Theoretical frameworks, including those proposed by Hall and Parsons, provide a foundation for comprehending the unique characteristics of youth development and culture. In the context of Albania, the study delves into the transformative impact of technology, particularly in the aftermath of democratic processes that liberated the media from communist control. The digital age has brought about unprecedented access to information, shaping the journalistic landscape and influencing citizen contributions. The COVID-19 pandemic further accentuates the role of social media in reshaping adolescent interactions, necessitating a comprehensive understanding of its implications. Turning to Bulgaria, technology emerges as a potent force influencing cultural perceptions, striking a balance between modernization and cultural heritage preservation. The digital realm serves as a platform for Bulgarians to engage in linguistic expression, access cultural resources, and redefine their cultural identity. The economic landscape plays a pivotal role in shaping youth trends in both countries, influencing spending patterns, entrepreneurial endeavors, and employment opportunities. Social class distinctions contribute to the formation of unique subcultures among youth, impacting music, art, and entertainment choices. In conclusion, this research contributes to a nuanced understanding of youth culture in Albania and Bulgaria, emphasizing the interplay of global and local influences.

Keywords: Youth culture, Albania, Bulgaria, Global-Local Dynamics.

1. Introduction

The concept of *'youth'* has been a focal point for scholarly investigation ever since the pioneering work on adolescence by psychologist G. Stanley Hall in the early twentieth century (Hall, 1906). The term 'youth culture' was introduced by sociologist Talcott Parsons in 1942. Despite their distinct perspectives, both Hall and Parsons perceived youth as a distinct and separate phase in human development, characterized by potential challenges in adapting to societal norms and expectations. Subsequent generations of sociologists and psychologists have endeavored to delineate the distinctive attributes of youth and youth culture, often presenting varied interpretations and perspectives. The attention given to culture has become increasingly prominent within the field of sociology and social theory. This heightened focus is evident in the proliferation of journals and organizations dedicated to cultural and 'intercultural' matters established in recent years, as noted by Robertson (1992). Sociologists and social theorists are actively engaged in research on social psychology across various global regions, and the outcomes of these studies find publication in numerous technical journals.

Understanding youth culture in different regions allows for the appreciation of the rich tapestry of global diversity. Cultural variations influence how young people express themselves, form identities, and engage with societal norms. Examining youth culture provides insights into the evolving social dynamics within various communities and societies. The study helps uncover shared values, beliefs, and practices that contribute to the collective identity of the younger generation. As the world becomes increasingly interconnected, studying youth culture helps identify commonalities and differences that transcend borders. Global influences, such as technology and media, impact youth across regions, shaping shared trends and experiences. The primary purpose of comparing youth culture in Albania and Bulgaria is to gain comprehensive insights into the distinctive factors shaping the experiences and expressions of young people in each country. By delving into the significance of studying youth culture, articulating the purpose of the comparative analysis, and providing an overview of Albania and Bulgaria, this research aims to offer a comprehensive examination of the distinct youth cultures in these two nations.

2. Literature Review

The study of youth culture has been enriched by various theoretical frameworks that offer insights into the complexities of this dynamic phenomenon. Notably, G. Stanley Hall's work on adolescence at the beginning of the twentieth century laid the foundation for understanding the distinct phases of youth development (Hall, 1906). Talcott Parsons, in 1942, introduced the term 'youth culture,' providing a sociological framework to comprehend the unique characteristics of this demographic (Parsons, 1942).

Understanding the formation of global youth culture requires an exploration of the multifaceted influences that shape the behaviors and identities of young people. Media, technology, and globalization emerge as pivotal factors. Media plays a central role in disseminating cultural trends and shaping perceptions among the youth (McRobbie, 1991). Technology, especially digital platforms, and social media, significantly influences communication patterns and cultural exchange among young individuals. Globalization acts as a connecting force, facilitating the flow of ideas, trends, and cultural elements across borders (Robertson, 1992).

3. Method

This study employs a secondary research approach, delving into existing findings to synthesize insights, reconcile conflicting viewpoints, and establish novel connections between seemingly unrelated research. The research methodology primarily involves a desk research method, employing document analysis of recorded information available in books and on the Internet. The study adopts a comparative approach to analyze youth culture in Albania and Bulgaria. The primary data collection method is a comprehensive literature review. Existing research, scholarly articles, and relevant publications provide the foundation for understanding youth culture dynamics in both countries. As a desk research project, the study does not involve traditional sampling or direct participant engagement. Instead, it focuses on a wide range of scholarly works, books, and online resources that contribute to the understanding of youth culture in Albania and Bulgaria. Given the reliance on existing literature, ethical considerations primarily revolve around accurate citation and proper acknowledgment of sources. Rigorous referencing ensures the responsible use of previously published work, maintaining academic integrity.

4. Theoretical Background

4.1. Influences on Youth Culture

The significance of information in contemporary society is likened to a fundamental necessity, comparable to the air we breathe. The evolution of communication forms, dating back to the Gutenberg period, has witnessed continuous transformation, with the internet and digital technology emerging as vanguards of technological innovation. The era of globalization is inherently intertwined with communication, and the role of mass media in implementing novel innovations for societal benefit is integral. Albania, once under dictatorship until the 1990s, experienced a pivotal shift in media dynamics with the advent of democratic processes in the early millennium (Westerman, Spence & Van Der Heide, 2014). Despite economic challenges, Albanians, demonstrating a strong desire for information, witnessed media companies and the state investing in cutting-edge technology. Currently, 60% of the population has internet access, and every individual owns a mobile phone. In addition to traditional media, citizens actively contribute to the information dissemination process. Digital technology plays a crucial role in the daily work of journalists, facilitating precision, speed, and objectivity in reporting. Utilizing innovations such as data transmission, archiving, and sharing enhances the journalistic process. However, this advancement is not without risks. The unfiltered nature of information sources can lead to misinformation. The accessibility and low cost of contributing to journalism also pose challenges, although it is anticipated that archive logic will improve journalistic standards.

Authors such as B. Haak, M. Parks, and M. Castells (2012) underscore the progressive change, indicating that citizens now possess the ability to engage with extensive archives, contributing to and analyzing stories. Digital technology, exemplified by platforms like ArchiveSocial, is instrumental in creating a global archive for journalists worldwide. Beyond journalism, the internet serves as a repository for countless books, photos, music, and other forms of content, functioning as vital reference points for journalists. The advent of the COVID-19 pandemic has brought about a profound and drastic shift in the daily lives of individuals worldwide. The implementation of social distancing measures, albeit essential for mitigating the spread of the virus, poses a considerable challenge for inherently social beings. Among the demographic significantly affected by this altered lifestyle are adolescents, who, due to their heightened need for emotional and physical attachment with peers, find the social distance measures particularly challenging. The impact on adolescents is exacerbated by the fact that this developmental period is characterized by both biological and psychological changes, rendering them uniquely sensitive to abrupt disruptions in their routines. The role of social media, a transformative force in reshaping adolescent social interactions, has come under scrutiny in debates examining its effects on the well-being of teenagers. The COVID-19 pandemic has intensified this societal discourse, given the heightened reliance of teens on social media during this period. As adolescents increasingly devote more time to social media platforms during the pandemic, a critical societal dilemma emerges. To navigate this complex landscape effectively, it becomes imperative for parents, educators, and adolescents themselves to cultivate a comprehensive understanding of social media usage within the context of COVID-19.

In the dynamic landscape of Bulgaria, technology has emerged as a potent force, profoundly influencing cultural perceptions and fostering a delicate balance between modernization and the preservation of cultural heritage. The interconnectedness afforded by digital connectivity has played a pivotal role in shaping how Bulgarians perceive and interact with their cultural surroundings. The advent of the internet, a transformative force in global communication, has provided Bulgarians with unprecedented access to diverse cultural influences. Social media platforms and online forums have become conduits for cultural exchange, allowing Bulgarians to share their rich traditions while gaining insights into a myriad of global perspectives (Bourn, 2014). Digital media, a ubiquitous presence in contemporary society, has redefined how Bulgarians consume information and entertainment, exposing them to cross-cultural content and narratives (Angova et al., 2023). Technology's impact on cultural preservation is evident in the digitization initiatives undertaken by cultural institutions. Digital archives ensure that Bulgaria's traditional customs, art, and history remain accessible,

transcending physical boundaries and reaching a broader audience (Nedyalkova, 2015). Language and communication, integral components of cultural identity, transform the digital realm, where Bulgarians engage in linguistic expression and global communication through online platforms.

Education and awareness benefit from technology-driven initiatives, with e-learning platforms offering resources that delve into Bulgaria's rich history, literature, and arts. Virtual reality and online tours provide individuals with immersive experiences, allowing them to explore cultural landmarks and heritage sites from the comfort of their digital devices (Debailleux, Hismans & Duroisin, 2018). However, the narrative of technology's impact on Bulgaria is not without challenges. Disparities in access to technology may contribute to a digital divide, affecting how certain segments of the population engage with cultural content. Concerns also arise regarding the potential homogenization of culture, as globalized digital content may overshadow local nuances (Flew & Waisbord, 2015). Looking toward the future, ongoing technological innovation is poised to play a defining role in how Bulgarians express and redefine their cultural identity. Striking a delicate balance between leveraging technology for cultural enrichment and preserving traditional values will be a crucial consideration as Bulgaria navigates the evolving landscape of the digital age.

4.2. Socio-Economic Factors and Trends in Youth Culture

Economic conditions influence youth spending patterns in Albania, with fluctuations impacting choices in fashion, technology, and entertainment (Begolli, 2018). Economic environments in Albania shape youth entrepreneurship and innovation, impacting trends in business and technology. Economic fluctuations in Bulgaria similarly impact youth spending patterns, with an influence on preferences in fashion, technology, and entertainment. Economic conditions foster or hinder youth entrepreneurship and innovation in Bulgaria, influencing trends in business and technology. Social class determines access to cultural resources, impacting music, art, and entertainment choices among Albanian youth (Kokalari, 2016). Social class influences educational opportunities and aspirations, shaping career paths and ambitions. Social class in Bulgaria also impacts access to cultural resources, contributing to the formation of unique subcultures among youth. Social class influences educational opportunities and aspirations, contributing to the development of distinct youth subcultures. Employment opportunities shape the occupational identity of Albanian youth, influencing their values and perceptions (Zylyfi, 2019). Globalization affects employment patterns, exposing Albanian youth to diverse career opportunities. Employment opportunities shape the occupational identity of Bulgarian youth, influencing their values and perceptions. Globalization affects employment patterns in Bulgaria, contributing to the exchange of ideas among youth.

Albanian youth exhibit a diverse range of fashion trends influenced by both local and global factors. Urban streetwear and a fusion of traditional and modern styles are prevalent among Albanian youth (Hysa, 2018). The fashion scene in major cities like Tirana reflects a blend of Western influences and the desire to express cultural identity (Bano, 2019). Bulgarian youth fashion trends also showcase a mix of Western styles and traditional elements. Street fashion is popular, with an emphasis on comfort and self-expression. The urban youth scene in Sofia and other cities reflects a dynamic blend of global fashion influences and Bulgarian cultural elements. Both countries exhibit a strong connection between youth fashion and cultural influences. Traditional motifs, colors, and patterns may find expression in modern clothing, reflecting a sense of cultural pride. Social media platforms play a significant role in disseminating fashion trends and creating a cross-cultural exchange of styles.

Albanian youth have a diverse taste in music, embracing a range of genres such as pop, hip-hop, and traditional Albanian music (Lule, 2020). The music scene is characterized by the emergence of local artists and a fusion of traditional and modern sounds. Bulgarian youth also enjoy a variety of music genres, with a notable interest in pop, rock, and electronic music. The music industry in Bulgaria has seen the rise of local talents, contributing to a vibrant and dynamic music scene. Cultural heritage plays a significant role in shaping entertainment choices in both countries. Traditional music and dance events, as well as cultural festivals, contribute to the rich tapestry of entertainment options. The fusion of modern and traditional elements in music and entertainment reflects the dynamic nature of youth culture in Albania and Bulgaria.

Social media platforms, such as Instagram and Facebook, play a crucial role in shaping the cultural expressions of Albanian youth (Jusufi, 2020). Social media facilitates a dynamic cultural exchange, allowing Albanian youth to share and adopt global trends while expressing their unique cultural identity. Similar to Albania, social media platforms like Instagram and Facebook are dominant in shaping the cultural expressions of Bulgarian youth. Bulgarian youth engage in cross-cultural interactions on social media, contributing to the amalgamation of global and local influences.

Albanian youth actively engage in digital spaces, expressing themselves through various online platforms (Kasapolli & Kume, 2021). Online behaviors in Albania reflect the creation of a digital identity that combines global trends with local cultural nuances. Bulgarian youth exhibit active digital interaction, participating in online communities and expressing their cultural identity through digital platforms. Online behaviors in Bulgaria showcase a harmonization of global and local identities, contributing to a dynamic digital culture. Traditional media, including television and newspapers, continues to influence cultural perceptions in Albania (Cakrani, 2017). Traditional media platforms contribute to the dissemination of cultural narratives and help shape societal norms. Traditional media maintains a significant influence on cultural perceptions in Bulgaria, with television and newspapers shaping societal norms. Traditional media platforms contribute to the representation of cultural elements, impacting the perceptions of Bulgarian youth.

5. Conclusion and Recommendations

Albanian youth culture is characterized by a dynamic interplay of global and local influences, evident in fashion, music, and online behaviors. Social media, along with traditional media, plays a crucial role in shaping cultural perceptions, fostering a digital identity that harmonizes global and local elements. Economic conditions impact youth trends, influencing consumer behavior, entrepreneurship, and employment opportunities, shaping cultural expressions.

Bulgarian youth culture showcases a fusion of global and local elements, reflecting in fashion, music preferences, and online behaviors. Social media and traditional media contribute significantly to shaping cultural perceptions, with an active digital presence harmonizing diverse cultural influences. Economic influences, social class distinctions, and employment opportunities collectively contribute to the diversification of youth culture in Bulgaria.

In response to the dynamic landscape of youth culture shaped by the intricate interplay of global and local influences, a comprehensive approach to empowering and nurturing the younger generation is essential.

Moreover, the significance of entrepreneurship as a catalyst for shaping cultural expressions cannot be overstated. Policymakers are called upon to champion policies that actively support youth entrepreneurship.

In the realm of education, a paradigm shift is recommended to reflect the rich diversity and fusion inherent in contemporary youth culture. Promoting cultural inclusivity in educational curricula becomes imperative.

Parallelly, the integration of digital citizenship education stands as a key pillar in equipping students with essential skills for responsible online engagement.

To further enrich the experiences of the youth, collaboration between local and global stakeholders is paramount. Encouraging such collaborations facilitates cross-cultural exchanges, allowing young individuals to explore diverse perspectives and broaden their horizons.

Lastly, recognizing the profound impact of economic opportunities on cultural identity, advocates call for initiatives that create avenues for youth advancement. Policymakers and stakeholders are urged to champion programs that provide economic opportunities for young individuals.

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AESTHETICIZATION OF THE EDUCATIONAL ENVIRONMENT FOR FUTURE DESIGNERS IN INSTITUTIONS OF HIGHER EDUCATION

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Abstract

Within academic discussions, significant attention revolves around the concept of enhancing the environment aesthetically. Scholars propose defining this process as actively altering and supplementing elements of reality to elevate visual impact, explore new levels of aesthetic depth, and transmission of personal assessment of the beauty of nature, everyday life, works of art, etc. Highlighting its cultural dimensions, researchers underscore the inherent transformations embedded within this process. Aestheticizing the educational environment entails engaging higher education students in aesthetic exploration, the expression of aesthetic sentiments, the application of previously acquired aesthetic knowledge, and active involvement in creative endeavors. Recognizing these transformations underscores the crucial demonstration of an individual's spiritual essence and creative abilities, pivotal for the proper evolution within design education systems.

Keywords: aesthetics, aestheticization, educational environment, aestheticization of educational environment, future designers.

Formulation of the problem. The development of education is closely related to solving the problems of improving the aesthetic quality of the educational environment. It is necessary that students of higher education perceive, understand and appreciate the beauty, harmony, perfection that surrounds them, take an active part in the aesthetic transformation of the surrounding world. The focus of modern education on educating individuals with a high degree of aesthetic sensibility is gaining relevance. In the context of training future designers in institutions of higher education, it is important to use all available methods and means for introducing aesthetic elements into the educational environment.

Analysis of recent publications. The concept of introducing aesthetics into the educational environment was one of the first to be presented in T. Campanelli's work «The City of the Sun» (1623) as an idea of the ideal organization of the human community within the limits of aesthetic order, harmony, and perfection. This trend persists and is still actively developing in European pedagogical theory and practice. In the Ukrainian scientific and educational environment, significant progress in the study of this issue took place relatively recently. The basis for this undertaking was laid by such figures as H. Skovoroda (1961), V. Sukhomlynskyi (1976). There's a growing emphasis on the pivotal role of aesthetics in shaping both personal and socially significant qualities in individuals. Within contemporary Ukrainian pedagogical theory and practice, there's a notable shift towards integrating aesthetics into the educational framework. This shift has garnered significant attention from philosophers, cultural scientists, educators, and psychologists such as I. Zyazyun, O. Berlach, O. Demyanchuk, A. Chygurskyi, and G. Shevchenko.

The goal is to determine the methods of introducing aesthetic elements into the educational process of future designers in higher educational institutions.

The main part. In psychological and pedagogical research, the concept of «aestheticization» is gaining ground, defined as the process of imbuing any objective entity with an aesthetic form through the influence of aesthetics on an individual. Aestheticization is viewed as a means of structuring the educational process or as a fundamental educational principle. While there's a consensus among scholars regarding the integration of aesthetic elements into educational objectives, tasks, and overall organization, various experts such as O. Demyanchuk, A. Chihurskyi, and O. Berlach propose viewing the aestheticization of an educational institution as both a process and an outcome stemming from the inclusion of aesthetic components in the realm of education and training. Their perspective highlights how this inclusion contributes significantly to cultivating aesthetic consciousness, fostering an aesthetic worldview, and nurturing students' ability to make aesthetic judgments within higher education.

In higher education institutions, an integral aspect of the pedagogical process is the educational setting or atmosphere. This environment covers a number of factors, including material and technical aspects, sanitary and hygienic conditions, ergonomic requirements, aesthetic elements, psychological and pedagogical aspects. All these factors together contribute to the organization of the educational process in the process of professional training. It is necessary that these conditions meet the spiritual and social needs of the participants of the educational process, in particular cognitive, aesthetic, cultural and social requirements, as well as the needs for interpersonal communication.

Attempts to define the concept of «environment» in the context of educational institutions of different levels have given rise to several terms in pedagogical theory. These terms cover general concepts such as «cultural environment», «socio-cultural environment», «educational environment» or «educational space». They also extend to more specific terms such as «pedagogical environment», «pedagogical actions», «educational environment», «aesthetic environment», «cultural-humanitarian environment», «aesthetic-pedagogical environment», «aesthetic-pedagogical space»,

«artistic and aesthetic environment», «aesthetic environment of pedagogical activity», etc. Sometimes in such cases, the terms «pedagogical-aesthetic atmosphere», «aesthetic field», etc. can be used. These specific designations highlight aspects of the content and emphasize the various qualities of the educational environment, which indicates its multifaceted nature. They also emphasize the significant value of aesthetic elements in a complex educational environment, which is important for the successful implementation of the pedagogical process in the modern educational environment.

The aestheticization of the educational environment for future designers is of crucial importance for the promotion of innovation and enables the acquisition of professional competences with a priority focus on the laws of aesthetics. Let's identify some key elements that should be considered when creating an educational environment for future designers.

Diverse workspaces: Designers benefit from a variety of workspaces. Open collaborative areas facilitate the exchange of ideas, while individual workspaces allow for deep concentration. Such a dynamic environment that can be easily adapted to the different needs of design projects is essential.

Inspiring surroundings: Include elements that inspire creativity, such as artwork, nature and innovative design. Consider using natural light, plants and aesthetically pleasing decor to create an atmosphere that encourages creativity.

Technology Integration: Designers must have access to the latest tools and software. High-quality hardware and software are essential for project work and availability of these tools should be a priority.

Collaborative space: Design is often a collaborative process. Provide spaces for brainstorming, projecting and discussing ideas. Interactive whiteboards, projectors and digital collaboration tools should serve as tools in this process.

Materials and Resources: Designers must have access to a wide range of materials, from traditional art objects to modern fabrication tools such as 3D printers, innovative printing equipment, and more. This allows for experimentation and prototyping.

Comfort and ergonomics: comfortable furniture and ergonomic workplaces are vital. Designers spend long hours on the job, and discomfort can hinder creativity and productivity.

Learning Opportunities: Continuous learning and professional development should be obtained from seminars, courses and resources on industry trends that will allow designers to implement self-education activities.

Academic freedom: designers must be given some freedom to manage their time and projects. Autonomy can produce innovative decision-making and self-improvement processes.

A space for feedback and criticism: it is necessary to create a culture of feedback and criticism. Designers can benefit from peer reviews and constructive criticism. Designated seating for these events can be helpful.

Community and Networking: A sense of community among designers needs to be fostered, encouraging communication both within classroom activities and with external design communities. This can lead to new perspectives and cooperation.

Library collection: a well-chosen literature and resource collection of design-related books, magazines, and resources can be a valuable resource for the creation, implementation, and interpretation of creative projects.

Moodboards and demo areas: Create spaces where designers can showcase their projects, create moodboards, and display inspiring visuals. It can promote creativity and serve as a source of motivation.

Conclusions and prospects for further research. The educational environment of a higher education institution should act as a catalyst for the personal growth and development of future designers. Undoubtedly, aesthetic elements, such as beauty, harmony of the environment where professional training takes place, play a special role in the implementation of this process. It is also necessary to take into account a number of factors, including material and technical aspects, sanitary and hygienic conditions, ergonomic requirements, aesthetic elements, psychological and pedagogical aspects, which will encourage future designers to actively creative study and aesthetic evaluation of works of art and design.

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МОЛДО НИЯЗДЫН САНАТТАРЫ ЖАНА АЛАРДЫН ГЕОГРАФИЯЛЫК БИЛИМДЕР МЕНЕН БАЙЛАНЫШЫ

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SANAT-INSTRUCTIONS OF MOLDO NIYAZ AND THEIR CONNECTION WITH GEOGRAPHICAL KNOWLEDGE

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Аннотация

Молдо Нияздын санаттарындагы адеп-ахлактык, ыймандык, таалим-тарбиялык баалуулуктарды айкындоо менен бирге, анын поэтикалык саптарында орун алган географиялык билимдер менен байланыштуу жактары каралат. Окуучулардын дүйнө, мекен, аймак, чөлкөм, жер таанымдык көз караштарын жана түшүнүктөрүн өстүрүүдө географиялык билимдердин ролу анализделет. Түштүк-Батыш Кыргызстандын өндүрүштүк-чарбачылык тармагын келечекте өнүктүрүүнүн жолдору географиялык аспектте сунушталат. Анын санаттарынын негизин адам жөнүндөгү, адамдын адеби, жүрүм-туруму жөнүндөгү акыл-насаат нускоолору түзөт. Бардык нерсе ислам идеялары менен чечмеленген. Улуу акындан санаттарын окууга карата окуучу жаштардын кызыгуусун арттыруунун ыкмалары көрсөтүлөт.

Abstract

In this research article, in the process of learning the spiritual, moral, educational and enlightening values contained in the sanat-instructions of Moldo Niyaz (sanat - 1) a teaching, admonition, precept, a wise saying; 2) a lit. song consisting of rhymed aphorisms; a saying turning into a song), we considered some aspects of the connection of these sanats with geographical knowledge reflected in his poetic lines. The role of geographical knowledge in the expansion of students' worldview, world outlook, regional and country-specific concepts and information have been analysed. We recommend the prospects for a development of the economic sector of the Southwestern region of our republic in geographical and environmental aspects. The system-forming factor in the sanats of Moldo Niyaz is moral teachings. The article shows ways to increase the interest and motivation of schoolchildren to study the songwriting of the great poet-enlightener.

Ачкыч сөздөр: санат, адеп-ахлак, ыйман, кубулуш, ислам дини, Кызыл-Булак, Ак-Кыя, Мургап, Жерге-Тал, Каратегин, Түркстан, мусулман, Кашкар, Маргалаң, Шаймерден, үңкүр, география, астрономия, этнография, фольклор, Бухара, Самаркан.

Keywords: teaching, morality, phenomenon, islamic religion, Kyzyl-Bulak, Ak-Kiya, Murgap, Jerge-Tal, Karategin, Turkestan, Muslim, Kashkar, Margalang, Shaimerden, cave, geography, astronomy, ethnography, folklore, Bukhara, Samarkand.

Киришүү. Молдо Нияздын "Санаттарында" тарыхый-географиялык билимдер менен байланышкан саптар арбын кездешет.

Анын саякаттап кыдыруусундагы жер-суу аталыштарынын көбү учурда да аталып жүргөндүгү кызыгуу жаратат. "Санаттардын" саптарында берилген географиялык аталыштарга назар таштасак, ошол жердин, аймактын, шаардын чыгаан азаматтарын мактап, алардын эмгектерин даңктаган, сапат-касиеттерин барктаган таасын сыпаттоолор жана мүнөздөөлөр менен коштолот. Мына ушундай сүрөттөөлөрдү берүү аркылуу Молдо Нияз "жакшы адам" темасынын өзөгүн, маңызын ачууга далалаттанган. Акындын көз карашында "жакшы адамдын" жан дүйнөсүн бир нече уюткулуу сапаттар түзүүсү лаазым. Андай адамдардын көңүл чордонунда ар дайым эли-жеринин көйгөйлөрү турган; алар элине күйүмдүү, карамдуу, камкор, март, берешен болушкан; элин кантип башкаруунун, жетектөөнүн жөнүн билген лидер; акыл парасаты, эмгеги менен салыштырмалуу байгер жашаган инсан; элдик салт-санааларды мыкты билген киши; ар кайсы өнөр адамдарын баалай да, алардын кадыр-баркына жете билген киши; элдин башын бириктирүүгө, ынтымакташтырууга жөндөмдүү, иш билги ж.б.

Изилдөөнүн максаты. Молдо Нияздын көркөм чыгармачылык мурасын окуп-үйрөнүү жаатында окурмандын каалоосун жана умтулуусун жаратуу.

Изилдөө методдору. Жогоруда коюлган теманын алкагында тиешелүү тексттерди окуп-үйрөнүү, иликтөө, талдоо, салыштыруу, конкреттештирүү, тарыхый, картографиялык, жалпылоо усул-ыкмалары пайдаланылды. Тарыхыйлуулуктун жана логикалуулуктун

биримдиги принцибин жетекчиликке алуу иликтөө ишибиздин милдеттерин натыйжалуу чечүүнү өбөлгөлөдү.

Негизги мазмуну. Канчалаган мезгилдердин элек сынагынан өтүп келген санаттар, андагы таалим-тарбиялык сабактар, элдик эмпирикалык билимдер, рухий маданияттын кенч-казыналары акындын кол китеп мурастарында камтылгандыктан, аларды салттык маданияттын компоненти катары социалдык-экономикалык чөйрөлөрдө колдонуу учур талабы.

Молдо Нияз Кыргызстандын көптөгөн жерлерин кыдырып, а түгүл Мургаб, Жерге-Тал, Каратегин, кытайдагы Кашкар шаарына чейин саякаттап (учурунда Кашкардын үлкөн медересесинде илим-билим алган), ал жерлердеги эл жакшыларын боолголоп, билип, алар менен көзмө-көз жолугушуп сүйлөшүп, алардын эл-жер үчүн жасаган эмгектерин, кызматтарын медреседеги окуучуларына маалымдап, талабаларынын аң-сезиминде Ата мекендин ыйыктыгын, баркын, касиетин түшүнүүсүнө жетишип, мекенчилдик сезимдерин ойготкон.

Белгилүү журналист Адылжан Жажанов Молдо Ниязды саякатчылык жана инсандык дараметин мындайча таржымалдайт: “Азыркы беш мамлекеттин аймагын дервиштей болуп кыдырган, ыр китептерин тартуулап, окуп берүүдөн тажабаган Молдо Нияз баамчыл инсан болгон” [4, 101-б.].

Ал эми көрүнүктүү илимпоз-педагог Абдыкерим Муратов акындын кайсы жерлерди кыдырганын дааналап көрсөтүп, ал жайлардын эл алдыңкыларын, мыкты азаматтарын ырга салып ырдаганын, аларга дем-күч, шык, кайрат бергенин: “Молдо Нияз өз кызыкчылыгынанбы же атайын тапшырма мененби, же сопучулук агымындагы адамдардын дервишчилик жашоо образын тандаганданбы, айтор, ал көп жерди, көп элди кыдырып көргөн, ошол барган жерлеринен географиялык-климаттык, этнографиялык, фольклордук маалыматтарды, чыгармаларды жыйнаган, өз жазгандарын кол китеп таризине салып элге тараткан. Кашкар, Бухара, Самаркан, Ат-Башы, Жумгал, Каратегин, Өзгөн, Жалал-Абад, азыркыча айтканда, Өзбекстандын, Тажикстандын, Кыргызстандын, Кытайдын көп жерлерин көргөн”, - деп жазат [5, 18-б.].

Көсөм акын, биздин көз карашыбызда, ошол замандын мерчеминен алып караганда көптөгөн күндөргө, айларга созулган “жол азабын” тарткан “Жер таануу”, “Эл таануу”, “Адам таануу” максат-мүдөөрүнө жетишүүнү көздөгөн болушу ыктымал. Муну анын санаттарынын мазмуну да көп жагынан күбөлөйт.

Жогоруда келтирилген ойлорго мисал катары санаттардан төмөндөгү саптарды тартсак болот:

Алай журттун султаны
Азимдай мартди көрбөдүм.
Алты-Арыкка сен барсаң
Аиткахар миңбашы
Риштанга сен барсаң
Каландардин баласы
Шакирдей мартди көрбөдүм.
Карванин журту бейарман
Баламатка жолугуп
Бакирдей мартди көрбөдүм [1, 82-б.].
Жаңы өспүрүм жаштыкта
Балачылык мастыкта
Баары журтту аралап
Йакшыларды көп көрдүм.
Башы Токмок, Чүй, Талас,
Кетмен-Төбө, Суусамыр,
Алай менен Анжиян
Азизи көп Наманган
Пайитактуу Маргалаң
Йакшыларды көп көрдүм [1, 82-б.].
Экинчи кол китебинде:
Көрдүм жүрүп далайды,
Кара-Тегин, Алайды.
Кашкар менен Кабакты,
Көп көрдүм эшен, калпаны,
Ат-Башы менен Арпаны.
Көргөмүн чукур Жумгалды,
Көргөмүн шондо жыргалды,
Суусар телпек сулуулар
Сүзүп көзүн ыргалды [1, 156-б.].

Акын кыш айларынан кийинки келген жаз мезгилин абдан көркөм, таамай жана элестүү сүрөттөйт. Жайкалган, жаркыраган көлдө каздардын сүзгөнүн, байлардын жайлоого көчүшү башталып, айран-сүт мол болуп, элдер куурдак жешип, гүл кымыз ичип жыргашып, кыргыз элине мүнөздүү жашоо-тиричилик өзгөчөлүктөрүн таасын чагылдырат:

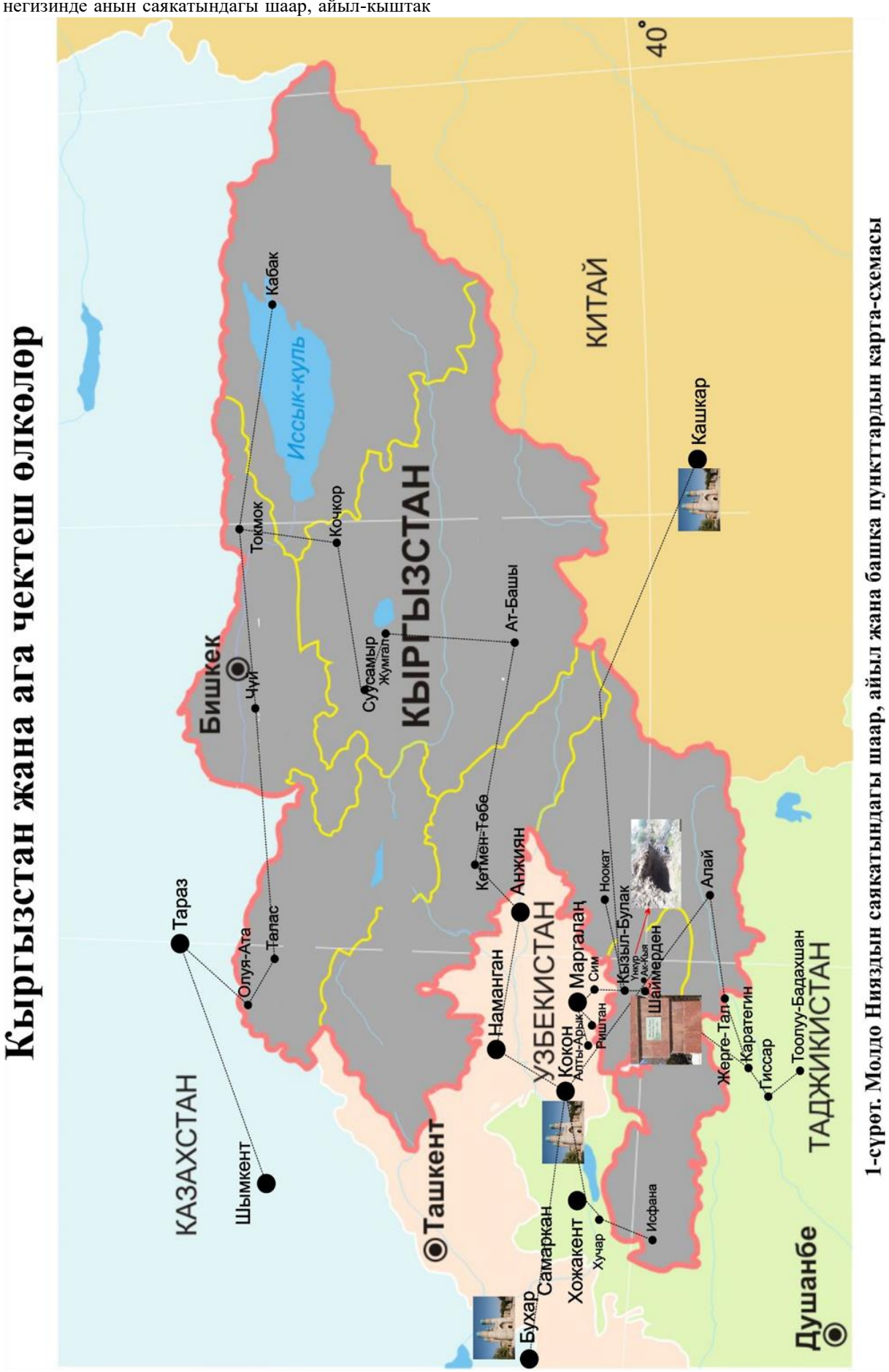
Үч ай токсон өткөндө
Бахардан жакшы бар бекен?
Айланма көлдө жарк этип,
Айланып учуп “гарк” этип,
Каздан жакшы бар бекен?
Алачылык көп жатса
Саздан жакшы бар бекен?
Агын суудай, айран, сүт
Гөш кувурдак, гүл кымыз
Көчмөн байлар Алайда,
Жаздан жакшы бар бекен? [1, 47-б.].

Молдо Ниязды санаттарынын дагы бир өзгөчөлүгү катары анын ар кандай көрүнүштү тилдик көркөм каражаттар аркылуу так бергендиги баамдалат. Маселен, ар бир жердин же шаардын эли эмнени өндүргөндүгү менен сыймыктанат, ошол жерде жашаган калкты бийиктетип турган нерсе эмне, же болбосо эмнеси менен бааланат, мына ушундай сыпаттоолорду да таасын келтирет. Мындай мүнөздөмөлөрдү улуу акын “кани”, “жайы” деген сөздөр менен ачыктайт. География сабагында окуучуларга тигил же бул жердин ресурс байлыгы тууралуу маалымат берүү максатка ылайыктуу. Бул Молдо Нияз жашаган замандагы фактылык маалыматтар. Аны азыркы учурдагы маалыматтар менен байланыштыруу далалатын жасоо, окуучулардын тарыхый жана экономикалык география жаатындагы көз караштарын, билимдерин арттырары шексиз.

Илимнин кани Бухарда,
Койдун кани Гиссарда.
Хандек өрүк Хушарда (Хучарда)
Гүрүчтүн кани Анжийан,
Майиздин кани Наманган.
Парчанин кани Маргалаң,
Арчанын жайы тоолордо,
Ылаачын ойнойт зоолордо.
Кара чай жайы Кашкарда,
Койдун кани Кочкордо.
Жылкынын жайы Жумгалда,

Түлкүнүн жайы Тар-Көлдө [1, 119-120-бб.].

Төмөндө Молдо Нияздын санаттарынын негизинде анын саякатындагы шаар, айыл-кыштак ж.б. пункттардын көрсөтмөлүү карта-схемасын сунуштайбыз:



1-сүрөт. Молдо Нияздын саякатындагы шаар, айыл жана башка пункттардын карта-схемасы

Молдо Нияз санаттарында окуучуларына дүйнө, мекен таанымдык көз караштарын өстүрүүгө өзгөчө маани бергендиги байкалат. Маселен, “Ысык-Көл барып балалап, Индустан кетер куш деген”, “Буудайдын кани Ноокатта” деген саптар географиялык билимдер менен бирге элдердин, канаттуу куштардын жашоо-тиричилик өзгөчөлүгүнө мүнөздүү болгон маалыматтарды берүү милдетин аткарат.

6-класстын географиясынын “Кыргызстандын калктуу пункттары” деген теманы өтүүдө кыргыз элинин байыркылыгын, каада-салт, үрп-адат, оозеки чыгармачылыгын, “Туулган жердин топурагы алтын” деп элдик нускада айтылгандай кичи мекенин, Ата журтун сүйүүгө, коргоого тарбиялоодо, анын байлыктарын туура, сарамжал пайдаланууда акындын санаттары менен байланыштыруу иш-аракетин жасоо, натыйжалуу ыкма болуп эсептелет.

“Кыргызстандын ландшафттары” темасын өтүп жатканда (география, 8-класс), күнөстүү жергебиздин жаратылышынын көп түрдүүлүгү, кооздугу, көркөмдүгү, тоо климаты, мөңгүлөрү, суулары, топурак-өсүмдүктөрү жана жан-жаныбарларына аяр мамиле кылуу көз караштарын кеңейтүү, өстүрүү, мындайча айтканда эстетикалык жана экологиялык тарбия берүүнүн элементтери менен байланыштыруу аракетин жасоо, мында даанышман акыныбыздын тиешелүү саптарын камтуу, касиеттүү табиятыбыздын баркын, баасын түшүнүү жаатында окуучулардын көз караштарын торолтот жана алардын кызыгуусун ойготот.

9-класстын географиясында Ош, Баткен жана Жалал-Абад облусттарын окуучуларга өтүүдө Молдо Нияз барган шаар, айыл жана өрөөндөр менен интеграциялоо иш-аракеттерин жасап, балдардын атуулдук, жарандык, мекенчилдик сезимдерин тарбиялоого, алардын экологиялык түшүнүктөрүн калыптандырууга маани берилүүсү кажет.

Шаймерден суусу көк мелжиген тоо мөңгүлөрүнөн башат алып, Шаймерден айылын аралап, кууш өрөөн аркылуу өтүп, илимий-географиялык көз карашта Бүргөндүнүн чыгышы, а түгүл Фергана өрөөнүнүн талаа, чөлдөрүнө чейин суу берилери жергиликтүү картага таянуу менен көрсөтмөлүү жана элестүү түшүндүрүлүү усулу сунушталат.

Ошол кезде көптөгөн орто азиялык медреселерде окутуп-үйрөтүү процессинин өзөгүн ислам динининн эреже-жоболору түзүп, окуучуларга эне тил, адабият, тарых, география, астрономия, математика ж.б. илимдердин негиздерин үйрөнүп өздөштүрүшкөн.

Молдо Ниязды санаттарында орун алган адеп-ахлактык, ыймандык, таалим-тарбиялык маани-мазмунду география предметин окутуу процессинде тиешелүү темалар менен айкалыштыруу иш-аракетин жасоо, биздин оюбузча, окуучулардын акындын поэтикалык дүйнөсүнө, анын педагогикалык-философиялык ойлоруна болгон кызыгууларынын жаралуусуна түрткү болот.

Түштүк-Батыш Кыргызстандын, жер кыртышынын катуу жана таштактуу, сугат жери тартыш болгон “таштан ырыскы талашып жашап жаткан, эркин жана мекенчил сезими күчтүү эл” Кадамжай элинин жана районунун келечегин төмөнкүлөрдөн көрөбүз:

Мал чарбасын өнүктүрүүгө жайлуу болгон Кожо-Ашкан жергесине (бирок, жолу татаал), Айдаркен жана Алай өрөөнү аркылуу жол курулушу абзел.

Алай тоо томунун (5880 м.) түбүндө жайгашкан, температурасы болжолдуу +80 болгон, андан 3-4 метр аралыктан чыккан ысык жана муздак булактардан келечекте эс алуучу-дарылануучу мекеме курулушу күтүлөт; өрөөндөгү бийиктиги 5000 метрден ашык болгон чокуларга чыгууга келген альпинисттер үчүн ыңгайлуу шарттар түзүлөт.

Айдаркен жана Кадамжай тоо-кен комбинаттары реконструкцияланып, заманбап технологиялар менен жабдылып, толук ишке киргизилүүсү максатка ылайыктуу.

Сох дарыясындагы Лимбург-Өтүкчү суу каналы кеңейтилип, андан алынган суу менен Бүргөндү массивине салынган суу каналы кеңейтилип, мелиорация жана ирригация иштери жолго коюлуп, талаалардын сугаты үнөмдүү жана сарамжал жүргүзүлүп, жүзүм, анар, мисте, бадам, карагат, куурма, өрүк, дарбыз, цитрустук-лимон, апельсин, мандарин ж.б. мөмө-жемиштердин түркүн түрлөрү өстүрүлүп, Баткен облусунан сырткары республикабыздын социалдык-экономиналык өнүгүүсүнө пайдасын тийгизет.

Ошентип, илимий макалабызда Молдо Ниязды санаттарында камтылган асыл ойлорду, рухий баалуулуктарды, маданий дөөлөттөрдү, анын география илими менен байланыштуу аспектилерине анализ жүргүзүп, предметтин тиешелүү темаларын өтүүдө пайдалануу жактарын карап, усулдук көрсөтмөлөрдү сунуштоо иш-аракеттерин жасадык.

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МОДУЛЬ КАК ВАЖНЫЙ ФАКТОР УПРАВЛЕНИЯ САМОСТОЯТЕЛЬНОЙ РАБОТОЙ СТУДЕНТА

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MODULE AS AN IMPORTANT FACTOR OF STUDENT'S INDEPENDENT WORK MANAGEMENT

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Аннотация

В данной статье рассматривается разработка модульных материалов для самостоятельного обучения студентов.

Большое внимание уделяется методической функции преподавателя при выполнении самостоятельной работы студентов.

Abstract

This article discusses the development of module materials for independent education of students.

Much attention is paid to the methodical function of the teacher when performing independent work of students.

Ключевые слова: дидактика, интеллектуальная, мотивация, инновация, классификация, дифференциация, интеграция, динамизм.

Keywords: didactics, intellectual, motivation, innovation, classification, differentiation, integration, dynamism.

The system of independent education provides very wide opportunities. Students in the process of their cognitive activity, along with educational material received from teachers, use additional information. This information appears to them as the fruit of self-awareness and independent education. Despite the great importance of the educational material sent by the teacher, the information acquired by the student in the process of self-awareness is more productive. The content of independent education is much broader than the content of education. In the process of independent education, the student has the right to choose the content of education. It reflects the goals and objectives of the student in mastering certain knowledge and skills.

The purpose of the study: the development of scientific and methodological materials for independent education, which, in turn. it has various didactic capabilities, namely:

- increases (strengthens) the knowledge, skills and abilities of the learner;
- activates the main ideas, concepts, processes related to the processes being studied;
- transmits the studied material;
- expands the amount of knowledge of the student;
- forms the practical skills and abilities of the student;
- manages the teacher's learning activities and the cognitive activity of the student;
- stimulates a scientific approach to the creation of new material for independent education [1].

The materials of independent education used in the system of independent education assume various tasks. Among them, we can list the tasks of self-determination, management, control, informational, cognitive, educational, intellectual, developmental, motivational, stimulating, innovative and other tasks.

The materials of independent education are classified according to several criteria [2]:

1. By the nature of the educational material: knowledge and information obtained from textbooks,

educational and methodological manuals; additional material; standard texts of lectures, etc.

2. According to the volume of educational information: the full volume of the studied questions, information on the subject of the discipline. Information technology-related material.

3. By the term of use: handout for one-time use. The material used in the classroom repeatedly.

The material of independent education, communication between students and the teacher are the leading components in the process of independent education. The degree of interaction of these two components contributes to the equation of models of open education [3].

This activity will be effective under the following circumstances. The student's activity will be effective if he can independently use educational and training materials, distinguish and analyze them. At the same time , the following skills of the trainee are important:

- work with scientific documentation, identification of originality in its content, classification of the studied phenomena and factors;

- analysis of educational material, identification of leading ideas and their argumentation (justification);

- systematization of educational material, identification of the main components, determination of pronounced connections between them and their didactic capabilities;

- regulation (ordering) of the process of using the material of independent education, their replenishment and updating [4].

It should be taken into account the fact that many students have not previously faced the problem of independent work and the material of independent education. The materials of independent education, unlike textbooks, educational and methodological manuals, are complex by the nature of the structure. As practice shows, many trainees in the learning process cannot objectively assess their skills of working with material for independent education. This assessment is always personal (subjective). A serious problem arises – how to ensure the objectivity of this process. In our opinion, there is a solution to this problem – it is necessary to develop, define, justify and apply criteria for assessing students' skills with material for independent education. Certain criteria should be dynamic and flexible. Each student chooses criteria in accordance with their readiness for self-assessment, organization and correction of their activities [5].

The criteria for assessing the level of mastery of students' skills of independent work with the material of independent education look like this:

- the highest level – the student has mastered the educational information transmitted in lectures and practical classes on the subject, is inclined to consolidate and expand the scope of this information. He is familiar with the electronic textbook and other literature available in the center of information and resources of the educational institution, has the skills to draw the necessary material from them and perform independent work correctly and in full;

- high level – the student has mastered the educational information transmitted in lectures and practical classes on the subject, but is indifferent to the consolidation and expansion of this information, is familiar with the literature available in the information and resources center of the educational institution, sometimes devotes time to this;

- intermediate level - the student partially possesses the skills of independent work with the material for independent education, i.e. is not familiar with electronic literature available in the center of information and resources of an educational institution, audio, video materials, materials, partially possesses the knowledge and skills to perform independent work [6].

The material for independent education is the main link of independent education. Their completeness and practicality largely determines the effectiveness of the educational process. In these conditions, it is important to enrich the material for independent education on an ongoing basis.

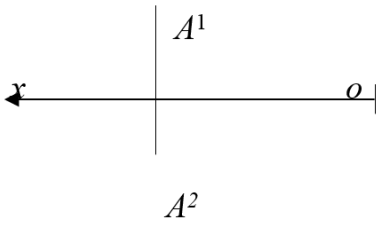
The first link in the chain of cognition of any subject or phenomenon, including educational material, is the perception of the studied material. The student perceives the material on descriptive geometry mainly through visual and auditory analyzers, since the student simultaneously explains the theoretical material, demonstrates its spatial scheme, and graphic actions for practical implementation in projections, i.e. in conventionally flat images. At the same time, the students' minds reflect mainly the current properties and signs of the phenomena being explained. With the development of the topic, the content and related graphic images are mutually replaced [7].

Now traces of the perceived phenomenon remain in the student's mind, i.e. separate ideas about the properties and signs of the material being explained. For example, the position of a point in space is explained in connection with the nature of its location on octants. But the representation of the point projections in relation to the projection axis remains in the students' minds, and the student tries to memorize them. This simultaneous perception of the material of the topic under study and its primary awareness, scientific understanding of the true essence, causes and effects is carried out with the help of thinking, since it is impossible to achieve this only with feelings. The more representations in the student's mind were formed with the help of perception, the more accurate and transparent they are, the more material for thinking. Representations in the student's mind are perceived by auditory analyzers, since the teacher, explaining the theoretical position, simultaneously connects it with the spatial scheme, understanding of the material in projections, and his spatial imagination. The student must have an irritated imagination that provides a complete representation of geometric formations occurring in space, not to lose sight of any part of them [8].

By repeated actions of the student with the application of knowledge in practice, his knowledge is deepened, skills and abilities are formed, creative abilities and talent are developed. In each regular exercise, the student discovers new facets of the material being studied and realizes it more deeply. The importance of in-

dependent education in solving these problems is important - it is the right organization and the right choice of material [9].

The level of complexity and difficulty of independent work should have the character of growth and development, thereby ensuring different thinking and mental independence of the student. Independent work should combine the setting of creative tasks and creative activity through analysis in exercises. For example, it is required to determine from a given horizontal and frontal projection of point A in which quarter of space it is located.



The problem is solved in the following logical way:

1. The point can be located in any quarter of space, i.e. A (1,2,3,4).

2. The frontal projection of point A can be below the projection axis x, i.e. A (3,4).

3. The horizontal projection of point A1 is located above the x axis, which means that according to the movement of the plane of horizontal projections H around the x axis, it It is located in the 3rd quarter, i.e. A(3).

Following such a reflection, the student can easily solve such problems.

Now we will place the frontal projection of point A2 in the x axis as in the previous example A1 was placed in the x axis. This state of affairs requires a creative approach from the student. In the previous examples, the distance of the point from the projection plane did not matter much, it was not even remembered. In the new examples (tasks), the issue of the remoteness of a point from the projection planes comes to the fore and becomes relevant. By solving new problems, the student determines the position of a point in part of the projection plane. The total number of such positions is 26, the student receives ample opportunities for the formation of skills and abilities. Taking into account the tasks assigned to independent education, the topics should be chosen as follows:

1. Tasks similar to those proved during practical classes, or such tasks, the way of solving which is similar to those previously shown.

2. The introduction of individual theoretical knowledge into practice.

3. Announcement of the main information on the topic, their generalization and formulation of conclusions.

4. Additional topics that are a continuation of what has been passed, but easy to understand.

5. Topics designed to expand what has been passed.

6. Tasks that require a creative approach.

Below is a diagram of a modular system for preparing independent education material.

The module is a relatively small part of the material of independent education, which consists of the presentation of some interrelated ideas, proofs, phenomena. Most often it is educational, methodological and managerial information. The trainee can study them in a short time. This is explained by the possibility of concentration of attention in the intensive process of cognition.

The modules are related to a number of factors: the intended training material, quantitative characteristics of the contingent, the purpose of training, form, method and content. They can be multiplied or decreased due to these factors. Usually, modules are combined according to the individual sections of the training course.

Structural components (components) of the module:

1. Instructions, ways of independent education, goals and objectives of the educational material.

2. The content of the educational material to be assimilated by the learner.

3. Independent tasks, practical tasks to consolidate the acquired knowledge, skills and abilities.

4. Criteria for self-assessment by trainees in order to verify the results of independent education.

5. Methodological material that ensures the quality of independent teaching (manuals, instructions, recommendations).

6. Sources of educational and methodological information used in the process of independent learning.

The main characteristics of the module:

• independence – the module as a structural unit, has a private content of education that differs from others;

• limited time to implement the goals and objectives of the module;

• dynamism – the ability to quickly change the component of the module in accordance with the goals and objectives of independent education;

• components of the module – differentiation and integration of structural components, their implementation of a kind of practical task;

• interdependence and interrelation of the module components: each of which is interconnected by location in the module structure;

• the effectiveness of studying independent educational material due to its relatively smaller volume;

• the ability to assess the learner's cognitive activity;

• integrity, the need to use a set of structural components that reflect the functions of the module;

• the module can be presented in any form: printed, audio recordings, computer programs, etc.

The technology of creating a modular independent education material is based on the gradual inclusion of all components of the material.

The material of independent education developed on the basis of a modular system differs from the traditional educational material, first of all, by the presence of didactic and methodological components indicating the management of the educational process and teaching of methodological methods and effective forms of independent cognition.

Thus, the modulated material for independent education is considered as an important factor in the control and correction of the student's independent education.

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PHILOLOGY

ABOUT THE CHTHONIC WORLD IN AZERBAIJANI FAIRY TALES: TIME AND SPACE

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Abstract

Azerbaijani fairy tales, deeply rooted in the rich cultural tapestry of the region, provide a fascinating glimpse into the collective imagination of the Azerbaijani people. This research article explores the chthonic world in Azerbaijani fairy tales, focusing on the intricate interplay of time and space. Through an analysis of Azerbaijani fairy tales, this study aims to unravel the cultural, historical, and symbolic dimensions embedded in these fairy tales, shedding light on how the Azerbaijani people perceive and conceptualize their world.

The study analyzes the structure of the chthonic world based on the aspect of space and time, system of space and time. Characters, forms and the diversity of the shape of the chthonic world are also analyzed: as the underground world, the chthonic world of the dead, thus concluding to the most important question of folklore research in the means of this theme — localization sites of chthonic world in the mythological worldview.

Keywords: chthonic world, Azerbaijani fairy tales, time, space, underground world.

Introduction

Azerbaijani fairy tales are traditional stories passed down by the Azerbaijani people. They cover a range of topics, including the heroic history of Azerbaijan and its struggles against both local and foreign oppressors. These tales also convey spiritual, moral, social, and philosophical perspectives. They serve as a means of preserving ancient national traditions and customs, while also showcasing the natural beauty of Azerbaijan, such as its lush valleys, majestic mountains, flowing rivers, and vibrant gardens.

The chthonic world in Azerbaijan fairy-tales: time and space is dedicated to one of the most significant issue in the Azerbaijan folklore study. The concept of time and space plays a crucial role in characterizing the chthonic world as a phenomenon, revealing mythical perceptions of a three-part structure, particularly focusing on one of its essential zones—the underworld or chthonic space in all its diverse manifestations.

In traditional Azerbaijan mythology, the chthonic world is portrayed as a complex space, presenting numerous challenges in the study of Azerbaijan mythology. Folklore materials, as well as fairy tales depict the chthonic world not as a unified entity. Unlike the clearly defined heavenly realm, the chthonic world in folklore can take various forms, such as the realm of the dead, graveyards, and specific places imbued with such significance—threshing barns, caves, meadows, and forests. This diversity in representation makes it challenging to pinpoint the exact location of the chthonic world. For instance, in the "Tale of Jirtdan"

The folklore material further complicates matters by blurring the lines between the chthonic space and objects perceived as entrances to this space, acting as intermediaries between the tangible world and the chthonic realm. This ambiguity makes it difficult to characterize the chthonic space in terms of its visual, symbolic, and mythical aspects, influencing the interactions of chthonic characters within it. For a more accurate understanding of the chthonic world, it is essential to focus on its representatives—heroes, creatures, spirits, and deities who inhabit or symbolize it. These entities provide insights into the nature of the chthonic world, shedding light on its characteristics in terms of time and space.

In the context of this article, the term "space time-chronotope" is a fundamental concept, derived from the combination of "time" and "space." Additionally, terms such as "chthonic space," "scenery of the chthonic space," and "the chthonic world of the dead" are crucial for denoting the phenomenon under investigation. Perceptions that provide insights into the chthonic world are rooted in Azerbaijan mythology and ancient religious beliefs, with relevant information being extracted from folktales.

Drawing from fairy tales, the chthonic space can be categorized into two forms. One represents the chthonic world as the realm of the deceased, while the other signifies a space where a symbolic trial takes place—a hero can journey into this space and return to the world of the living as a living individual. In this context, the act of travel, specifically the motif of traveling, becomes a significant element, illustrating how the hero arrives at an understanding of the chthonic space and time. The majority of Azerbaijani fairy tales revolve around the theme of travel, providing insights into the chthonic world and its elements.

While investigating Azerbaijani fairy-tale texts, such factors are considered:

1) representation of the chthonic space in the text (underworld, the world of the dead etc.);

2) chthonic symbols (forest, Land of Fires, cabin in the forest and other symbols assumed to be chthonic);

3) chthonic characters, creatures, representatives (spirits, animals etc.).

It's important to highlight that the concept of the chthonic space manifests as a powerful and expressive mythical element, embodying ancient perspectives on themes such as death, life, initiation, and other significant events within this framework of understanding and insights. It is a widely and successfully used research method in folklore. Folklore researcher J. Meletinsky (М.Е. Мелетинский) indicates that this methodology

of analysis allows to expand the studied texts into functional groups - stylistic, storyline and mythical groups (Мелетинский 1977, 153).

Vladimir Propp's analytical framework for Russian folktales relies heavily on structural elements, but it falls short when disregarding the importance of functional symbols. When examining the initiation theme and the significance of travel within the context of chthonic space, Propp's functional scheme proves valuable in identifying consistent elements. However, when exploring the chthonic world and its characters, the scheme may not always be applicable, particularly when dealing with the realm of the dead. Propp himself acknowledges that these schemes can be reversed, and not all fairy tales adhere strictly to the prescribed structure.

While Propp asserts that entering the chthonic world is an integral part of fairy tales, there are instances where this process is omitted or the concept of the chthonic world is portrayed ambiguously, making it challenging to interpret its specifics or location, especially in symbolic terms such as meadow or forest instead of underground. Propp's fairy-tale analysis is structured around comparing tale structures, but his categorization often leans towards structural elements, neglecting the significance of function symbols highlighted by scholars like V. Turner and B. Malinowski. As a result, a structural functionality method can be employed, drawing from the rite theory in folklore and ethnology. Additionally, a deconstructive approach proves useful when dissecting the text for its deeper meaning. V. Propp's analyses corresponds with Azerbaijani fairy tale analyses.

The term "chthonic world" originated from Greek mythology, referring to the realm beneath the earth. It was introduced into Azerbaijan research in the 20th century. Although the term "chthonic" itself may not be used, the concept is integral to understanding Azerbaijan mythology. In contrast, scientific research in other countries often employs the term "Underworld" more frequently than "chthonic space."

In view of the available base of fairy-tale material, there are raised five variants of division:

1) the chthonic space as an underground cave, 2) the chthonic space as a specific place in certain situations on the ground, in an inhabited village area, 3) the chthonic space as a definite place in the heavenly space, 4) the chthonic sea, 5) unclassified location.

The primary focal point in fairy tale motifs for the comprehensive representation of chthonic space localization lies in the underworld and various subterranean forms. This underworld can encompass both the conventional human living spaces and distorted environments, characterized by their fantastical beings and realities, often emphasizing their non-existence in the real world.

Chthonic space localization patterns are closely tied to places within the human living space. A notable feature is the absence of clear references leading to the underworld; the journey into this space is portrayed as random. Surface space chthonic elements are commonly found in structures like castles, towers, forests, lakes (or islands surrounded by water), houses, and cabins in the woods.

While the localization in heavenly space is complex, within a specific context, the celestial realm becomes an expressed chthonic place. This localization is often symbolized by features like the glass hill, mound, or hill, where either the deceased enter or activities analogous to the chthonic place occur. In fairy-tale motifs, mountains can serve as both petrification sites and testing grounds. Similarly, mountains and the sky play significant roles in folk songs and beliefs.

Another crucial aspect is the chthonic sea, which holds significance not only as a primordial creation place but also symbolizes the chthonic space—a realm outside of conventional time and space. Unspecified parts of the chthonic space in fairy tales can be situated anywhere, such as Azerbaijan lands serving as a realization of chthonic space or the transformation of a hero into stone as the chthonic space localization of the stone.

A crucial element to consider is not just the mystical landscape itself, but also the road leading to it. In many fantastical scenarios, the manner in which the protagonist enters the mystical realm plays a pivotal role in establishing the location's significance within the broader world framework.

An essential aspect to contemplate is not only the enchanting realm itself but also the path leading to it. In numerous fantastical scenarios, the protagonist's entry into the mystical realm holds significant importance in establishing the location's relevance within the broader world framework.

The road follows a fundamental structure: A (beginning) - B (destination) - A+ (return to the starting point, albeit transformed). This expedition serves as both a catalyst for and a reflection of the hero's mental and physical growth. Notably, various types of transformation, including death, are regarded as motivations for such journeys.

The structural breakdown categorizes characters in the chthonic space into distinct groups based on their functions:

Chthonic Deities: This group includes entities like giants, the devil, and various creatures.

Chthonic Animals and Other Characters: This category encompasses beings like the toad, spirits, and other zoomorphic forms.

Spirits of the Dead: This group consists of ghosts and small entities with unique functions not covered in the previous categories.

It is crucial to differentiate representatives in the chthonic world based on their functions. The analysis of fairy tales breaks down as follows:

- Assistant/Savior Function: Characters fulfilling the role of providing support and expertise in the chthonic space when needed. This function can be attributed to a wide range of characters, including deities, chthonic animals, and others, except for the devil, which primarily serves as a counterforce or trickster.

- Injurious and Counterforce Functions: Characters in this category play roles that are harmful or counteracting. The devil is particularly dangerous, but other

characters, such as the toad or snake, may also fulfill similar functions.

- Mediator Functions: This category poses challenges, as mediators are creatures capable of moving between at least two parts of the world, like between the ground and the underground. In Azerbaijan mythology, creatures like the horses, snakes and certain birds are associated with mediator functions, especially evident in fairy-tale motifs. For instance, in the tale “Tapdig”, “Malikmammad”.

In the initiation fairy-tale motifs, the expression of chthonic space is remarkably diverse. The distinguishing features of chthonic areas, where the hero undergoes the initiation process, can be outlined as follows:Chthonic spaces can be situated anywhere in the mythical world; It is possible for the hero to return after completing the given task; Chthonic spaces are typically non-lethal; the hero, aided by magical assistants, overcomes challenges and returns successfully; Time is distorted within chthonic spaces, and upon the hero's return, the effects on the system may or may not persist; The visual representation of chthonic space also varies based on the gender of the character undergoing initiation. Female initiation emphasizes ethical qualities like kindness and wisdom, while male initiation is characterized by battles.

There are different types of initiation, including traditional single-person initiation and dual initiation, where both the protagonist and a chthonic world character undergo the initiation process. Another form is incomplete initiation, where the process remains unfinished, leading to distorted time and space upon the hero's return. Such tales are relatively rare and can be associated with shamanic initiation.

The portrayal of chthonic landscapes in initiation tales is extensive, providing a broader description of the chthonic world. The diversity in modeling chthonic space makes initiation tales unique and contributes significantly to the understanding of this phenomenon within the broader context of fairy-tale motifs.

The alteration of time systems constitutes a highly intricate and challenging phenomenon within the realm of the mythical world. Understanding the temporal dimension of the mythical world holds particular significance, especially in the context of initiation fairy tales, for several reasons:

If spatial distinctions outweigh temporal disparities in all alterations of the mythical world, the time system can be more precisely delineated. Particularly in motifs of initiation fairy tales, time is directly manifested. The narrative reflects changes in time analogous to the measurement of days and hours. In exceptional instances within fairy tale motifs, time undergoes deformations. For example, when the hero returns, the world has undergone transformation.

When a fairy tale or folklore hero enters the mythical world, they are immersed in a distinct temporal framework. Therefore, time becomes a crucial factor signaling the hero's presence in the mythical world. Analyzing scenes from initiation fairy tales reveals that temporal shifts are most prominent in those connected to broader journeys through the mythical world and, notably, those intertwined with death. Moreover, such shifts are integral to shamanistic initiation, where the hero experiences a transformative process as part of transitioning to a different social status.

This suggests that changes in the time system metaphorically represent the mental transformations undergone during the initiation process. The individual is altered, modified, and transformed, and these changes are symbolically linked to distortions in time within fairy tale narratives. The restructuring of time occurs not only when the hero enters the mythical world but also when the hero undergoes personal changes or transforms into another form. Moreover, the transformation process is a central characteristic of fairy tales, involving spatial and physical changes that are more explicitly depicted in motifs, while time, as an abstract concept, is embedded in the symbolism of objects and processes.

The concept of chthonic space, particularly when viewed as the realm of the deceased, can be examined through two key aspects: the “time-absence of time” and the “space-anti-space.” The former explores variations in the perception of time within different systems analyzed within chthonic space realizations. In this context, time is considered in relation to its absence or altered nature.

The “space-anti-space” aspect involves the representation of creatures and spirits within chthonic space. It emphasizes that entities themselves remain unchanged by definition, while their properties and functions may undergo transformation. It's crucial to differentiate between chthonic space in wonder-tales, where heroes venture for various reasons with the intention of returning, and the chthonic world of the dead. In the latter, the number of characters is limited.

In Azerbaijan fairy tales, the chthonic world of the dead lacks a specific definition, allowing for a broader range of localization sites and forms. The chthonic space type is defined by its unique time system, distinguishing between the time related to human life and the time associated with the world of the dead. This temporal framework can be characterized as the presence or absence of time. The coexistence of various world times is connected through the concept of time-space, yet a more detailed examination reveals distinctions between them. In the first scenario, time progresses linearly, while in the second, time stands still. In fairy tales, the absence of time frequently appears in scenes where the deceased beckon the living to join them in visiting the world of the dead.

The chthonic space-time system, as outlined in this thesis, emphasizes the concept of “absence of time,” representing time that does not unfold cyclically but remains stagnant. In folk stories, the absence of time is marked by immobility, contrasting with the depletion, loss, burnout, and entanglement associated with time in the world of the living (e.g., a burning candle, a loud noise, a yarn thread tangling). It is not just a different kind of time; it is the absence of time, a state where time does not progress or exist.

Examining the folklore representations of the chthonic world of the dead, the concept of "absence of time” emerges as a comprehensive characteristic. However, there are instances where the absence of time transforms into a semblance of time, especially when

the chthonic world of the dead intersects with the living world, introducing a conditional flow of time. The time system in the world of the dead, viewed as the location of the deceased, is influenced by the time of the living world, shaped by the characters' perspectives.

The analysis of the time system in the chthonic space proves challenging, given the mythical worldview where time functions differently, if at all. Time is not clearly defined in these texts, making it difficult to draw insights and conclusions. The folklore texts suggest that time has ceased to exist in the chthonic space of the dead, presenting an opposition to the earthly time system and the model of absence of time. While our chronology relies on units like day-night and year, these measurements lose significance in the realm of folktales. Chthonic time essentially embodies the absence of time, manifesting in visible deformations of the temporal system within fairy tales, emphasizing that time, as we understand it, does not exist in this context.

The creation of the world, as depicted in mythical narratives, is explored through both cosmogonic and aetiologic myths. Cosmogonic myths are more overarching, while aetiologic myths delve into specific aspects. In Azerbaijani folklore, cosmogony involves a dynamic interplay between forces, namely God and the devil, who engage in both conflict and cooperation while shaping the world. Creation myths serve to provide archaic humans with a sense of place, purpose, and the perception of nature as a divine creation, fostering an awareness of the sacredness of the natural world. In essence, cosmogonic and aetiologic legends address the origin of the world by emphasizing the involvement of two sacred beings and the interaction of two worlds.

Characteristic of cosmogony and anthropogony is a dual creation myth, wherein both heavenly and chthonic forces play a role in the creative process. The dual creation myth stands as one of the oldest concepts in Azerbaijan folklore, persisting with some modifications over time. In the context of mythical narratives, the chthonic space is viewed as a source of the origin of the earth and humanity. The term "chthonic" takes on a broader meaning, encompassing primitive forms of existence and serving as an analogue to origin. This is evident, for instance, in the portrayal of the chthonic world of the dead, where individuals not buried in a proper tomb, ensuring revival, are consigned to a chthonic equivalent of origin—a swamp. The perceptions of the world's origin are rooted in its chthonic genesis, highlighting the collaboration of opposing dual powers, where one is a celestial being and the other a chthonic deity.

Conclusion

In summary, this article explores the enduring elements of the chthonic in modern society. It is concluded that the chthonic world and its entities manifest in various forms within contemporary culture, both traditionally, maintaining their original imagery (as seen in graveyard culture and chthonic creatures), and in modified ways (such as the transformation of chthonic spaces). Specific chthonic elements have found adaptation within different subcultures, particularly within the gothic subculture. Characters from the chthonic realm, akin to elements of folklore in general, emerge prominently in society during phases linked to social crises and periods of transformation. It is noteworthy that during such times, society attempts to symbolize its negations, recognizing that established public institutions—be they religious or secular—are often inadequate in addressing public concerns. Consequently, society seeks alternative avenues for responses in these situations.

The chthonic world stands out as an intricate phenomenon, posing crucial questions in Azerbaijan folklore research related to defining chthonic space, pinpointing its location, and understanding the distinctions between its spatial forms and the structure of the temporal system.

In Azerbaijan fairy tales, the chthonic space exhibits its diverse forms, making it challenging to establish a unified system. While functional characteristics define certain forms, such as the chthonic space in initiation tales and the realm of the dead, there exists a division between the sacred middle and the chaotic, profane surroundings. Each form of the chthonic world establishes its unique center-side division.

Folklore genres introduce variations in the depiction of chthonic space, with fairy tales offering the broadest and most unique descriptions. A comprehensive understanding of chthonic space emerges when comparing it across different folklore genres like folk songs and beliefs. Wonder tales and fairy tales encapsulate key attributes of chthonic space, showcasing its diverse locations within the mythical world. Entry into the chthonic space may be intentional or unintentional, often driven by the pursuit of extraordinary knowledge.

Deities, spirits, and chthonic animals serve as representatives of the chthonic space, offering vital insights. The symbolism associated with these entities reflects aspects of chthonic space, such as dangers, its connection to its role as the world of the dead.

Azerbaijani fairy tales provide specific perceptions of the chthonic space, expanding visual and temporal descriptions. The chthonic world of the dead is characterized by terms like space-anti-space and time-absence of time. It exhibits complexity in spatial and temporal structures, featuring areas frozen in time and others, like cemeteries and forests, facilitating connections with this world.

The chthonic aspect is present in cosmogonic motifs, where the initial state of the world created by the demiurge is chthonic chaos. The creation process involves a deity shaping the world and a devil influencing the primary source. Myths about the chthonic world persist in contemporary society, manifested as chthonic elements. These elements, borrowed directly from folklore or adapted in various ways, play a role akin to a carnival in popular culture.

In summarizing various aspects of the chthonic world, it becomes evident that it is characterized by ambiguity and temporal variability. This is particularly observable in fairy tales, where there is a departure from the conventional hero-fight-counterforce structure. Instead, the chthonic space and representational characters align with the cultural norms of the time. Chthonic space takes on an ominous and perilous nature, capable

of exerting influence and posing threats. The heterogeneity of chthonic space is also influenced by folklore genres and scenes. The chthonic space from which the hero returns in initiation texts differs from the chthonic space where they exist as a spirit.

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SOCIAL COMMUNICATION STUDIES

DIGITALIZATION OF SERVICES: THE IMPACT ON TOURISM SECTOR IN ALBANIA

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Abstract

At a time when technological innovations and artificial intelligence have spread in every field of life and are facilitating the provision of many services, tourism has also become subject of these developments. However, the digitalization of the tourist services sector in Albania is low and there are a number of problems, which have been identified in the National Strategy for the Sustainable Development of Tourism 2019-2023, drawn up by the Ministry of Tourism and Environment of the Republic of Albania. The purpose of this study is to assess the degree of spread and impact of digitalization of services in the public and private spheres of tourism, and more specifically in travel agencies and tour operators in Albania. The main instrument used to collect quantitative data was a questionnaire designed with Google Forms, which was distributed to travel agencies and tour operators and was completed in person with representatives of these businesses. After the research work, it was concluded that facing foreign competitors, already digitalized, while Albania gradually enters a global tourist market, could bring out of operation most of the tour operators and travel agencies, bringing a collapse in the way this sector has traditionally developed. Recommendations for better management of the current situation would include the engagement of policy makers in information campaigns with businesses, regarding the advantages of digitalization in competition, productivity and sustainable development.

Keywords: digitalization, travel agencies, tour operators, digital tourism, e-Albania.

1. Introduction:

The world as we know it is changing rapidly and technology is the incentive for the betterment of the sector of services, particularly in the tourism industry. Innovations in receiving tourist services online are removing geographical barriers between tourists and host countries, creating opportunities to make any reservation or payment through the screen of a digital device. Findings from American Express Travel's "Global Travel Trends 2023" report suggests that Gen Z (people born 1997-2012) and Millennials (people born 1981-1996) are more likely to travel in 2023 compared to every other generation (54% and 43% versus an average of 41%), with their behaviors expected to make a difference in the travel sector. In Albania, according to the 2021 report "Tourism in Figures" by the Institute of Statistics INSTAT, it is noted that 57.6% of foreign tourists were of this age group and the numbers are increasing. Although Albania is currently a tourist attraction popular with Europeans, this does not ensure the continuation of the upward trends for years, especially as digitalization is becoming a crucial part of the consumer experience.Since technology is advancing rapidly, nowadays the only "weapon" that agencies have is a good marketing and that it can be achieved by all individuals is only through technology.Currently, the document of the National Strategy for Tourism, 2019 - 2023 lists digitization and the limited use of information technology in tourism among the weak points to be addressed in the next 4 years. However, this remains a complex sector affected by negativephenomenon such as the high informality of the sector and the high use of cash in payments for this service. Increasingly, information technology is becoming a key factor in the development of tourism in Albania. In recent years, Albania has had a significant increase in the number of tourists from abroad, mainly from European countries. Tour operators are making extensive use of information technology for the promotion of tourist destinations, the interaction between tour operators, and the continuous and sustainable increase in the number of tourists. In this context, they have created data banks and exchange information through different ways such as the Internet and different applications. Public institutions have mainly been content with drafting policies for the development of tourism and action plans in support of the tourist season. For all of the above, this study aims to reflect in detail the digital development of the public and private tourism sector in Albania, specifically of travel agencies and tour operators, analysis that comes after the identification of poor digitalization as a problem highlighted by the Ministry of Tourism of Albania. The description of digital public services offered by e-Albania for businesses in the field of tourism, the analysis of the indicators of digitalization in the private sector and the identification of difficulties and opportunities in the inclusion of digitalization in the tourism sector are some of the objectives of this study.

1.2 Statement of the Problem

In recent years, the global shift towards digitalization has significantly transformed various industries, including the tourism sector. In the context of Albania,

a country with a growing tourism industry, the integration of digital technologies into service delivery has become increasingly prominent. However, the implications and challenges posed by the digitalization of services in the Albanian tourism sector remain underexplored. This research aims to address the gap in understanding the specific impact, opportunities, and challenges associated with the digital transformation of tourism services in Albania. By investigating the current state of digitalization, identifying key trends, and evaluating the perceptions of stakeholders, this study seeks to provide valuable insights into how digital technologies are influencing the tourism landscape in Albania and to propose strategic recommendations for the sustainable advancement of the industry. In conclusion, it is fact that recently, we have been hearing a lot of talk about digitization in tourism. Digitalization plays an important role in the tourism sector and has major impacts on the way how the travelers plan, book and experience their trips. Since 2021 in Albania every public service has been digitized through the e-Albania platform, this innovation has brought benefits and achievements in the tourism sector as well, a field that needs to be studied.

1.3 Purpose and objectives of the study

This paper aims to determine the impact of the development of digitization mainly on the travel agencies and tour operators in Tirana, including the current development and the capacity of digitalization of the tourism sector, analysis that comes after the identification of poor digitalization as a problem highlighted by the Ministry of Tourism of Albania,without excluding the relationship that the latter creates in customer service and the facilities it offers both for agencies and for consumers.

Objectives:

- The role of digitization in tourism agencies
- The description of digital public services offered by e-Albania for businesses in the field of tourism
- The analysis of the indicators of digitalization in the private sector
- The identification of difficulties and opportunities in the inclusion of digitalization in the tourism sector; are some of the objectives of this study.

Hypothesis:

The hypothesis raised is that the current operating travel agencies and tour operators is quite indifferent to digitalization and for this reason, in a competitive market like that of tourism, this proves a pessimistic perspective for the country's tourism development, especially when the two most travel-prone age groups in the world are precisely those who grew up in the era of technological developments.

2. Methodology:

2.1 Description of the research design

The research method used in the study is the quantitative method of data collection, analysis and interpretation.Quantitative method was used, as it provides an understanding of the issue addressed, including a considerable number of subjects in a short time.The quantitative research in the study is built on the basis of the case study strategy. The case that is the basis of the research, are tourist agencies that operate in the market located in the area of Tirana and offer services and sell tourist packages from other operators. Quantitative research involves the collection, analysis, and interpretation of data to gain insight into a particular phenomenon that the authors are interested in. A structured questionnaire was used as the main instrument to collect the quantitative data of the study.

2.2 Study population and the sample

The group of subjects selected for this study consists of travel agencies and tourist operators operating in Tirana. The study is based on a sample of 20 travel agencies and 5 tour operators. The selection of the subjects was carried out in such a way that they met the conditions set pre-practically by the researchers.

Sampling

The sample of this study consists of travel agencies and tourist operators that exercise their activity in Tirana. The agencies selected to be part of the research were randomly selected in different areas in Tirana.

2.3 Data collection

The selection of the method for collecting the data of the study has been one of the main issues throughout the development of the study. For data collection, possible methods were browsed and researched, always taking into consideration the field and topic of the study, after browsing it was decided as the most appropriate, that in this study for data collection to use the structured questionnaire. Important in using this method was the good presentation of the purpose, objectives and hypotheses. This method allows the researcher to be flexible and in turn allows the interviewee to choose a time that suits them best for filling out the form. The data collection process took a period of 3 weeks. Data collection as mentioned above was done using the face-to-face questionnaire in the premises of the subjects selected in the study. Specifically, the completion of the questionnaire was done in a period of 3 weeks, from the end of November to the beginning of December 2023. Completing the questionnaire required a completion time of 10-15 minutes at most.

2.4 Design of research instruments

The scientific research involved restructuring and analyzing information based on the insight obtained from a survey divided into four sections. Each section had the corresponding questions, in total 30 questions, where there were defined alternatives as well as some of them determined with the Likert scale. participants could choose only one of the defined alternatives. One of the primary methods employed to construct this survey involved the use of close-ended questions. A thorough review of the survey questions was conducted in face-to-face sessions with representatives from tourist agencies. The time used to gather the information granted was a month, starting on the end of November 2023 until December 2023 and the work analysis became more detailed with the assistance of graphics, which showcased the core information. The measurement of the degree of digitalization of tourist agencies and tour operators in this study was done through a set of indicators. These indicators include the use of technological devices in the workplace and a digital database, a good and collaborative work online, presence

on social networks the use of common office software, etc. The sampling for this study comprises tourist agencies operating in Tirana, supported by a sample of 20 tourist agencies and 5 tour operators. In the second phase, the research was predominantly focused on discussions and literature review, which provided a clear framework for exploration and facilitating in-depth discussions. A crucial resource was the data research conducted by INSTAT, providing essential information on the digitalization within the tourism sector. While the data analysis lasted about 5 days. The analysis of the data was realized with Google Forms, through which the results for each question defined in the questionnaire were published. During the collection and analysis of the data, despite the fact that the participation was completely voluntary, the main principles of ethics were followed in the study, where all subjects participating in the study gave their consent to become part of the study, after being informed on the purpose, objectives and reasons for obtaining this information and how their data would be used. The confidentiality of the subjects involved in the study has been preserved.

3. Analysis and Data

The group of subjects selected for this study consists of travel agencies and tourist operators operating in Tirana. The study is based on a sample of 20 travel agencies and 5 tour operators. The selection of the subjects was carried out in such a way that they met the conditions set pre-practically by the researchers.

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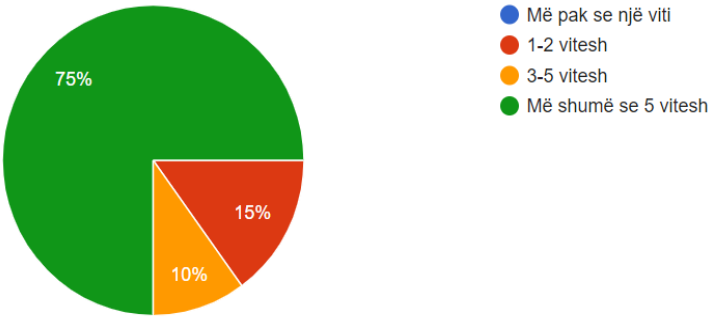

Figure 1. How long has the subject been active for?

Source: Author's processing

In the context of the graph in the Figure 1., it is evident that every surveyed travel agency and tour operator has maintained their operations for a minimum duration of one year, with none of them reporting an operational history of less than one year. The distribution of these entities reveals that 15% of them have been active for a duration spanning 1-2 years, 10% for 3-5 years, and a majority of 75% for more than 5 years.

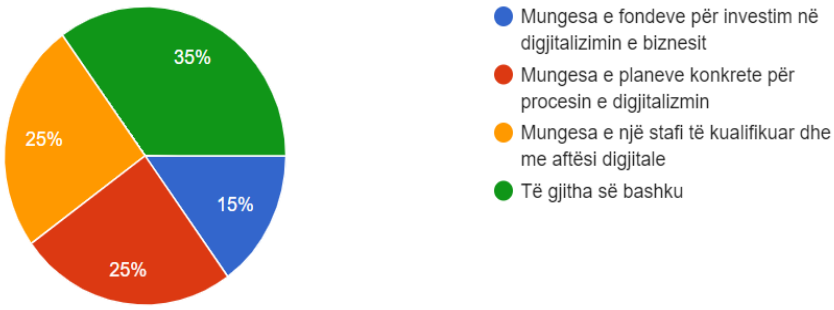

Figure 2. What are the factor hindering the digitalization of the business?

Source: Author's processing

According the graph in the Figure 2. it's obvious: The lack of funds for investing in the digitalization of the business 15%. - The absence of current plans for the digitalization process 25%. - The lack of a qualified and a digitally skilled staff 25%.- All of the above 30%. -

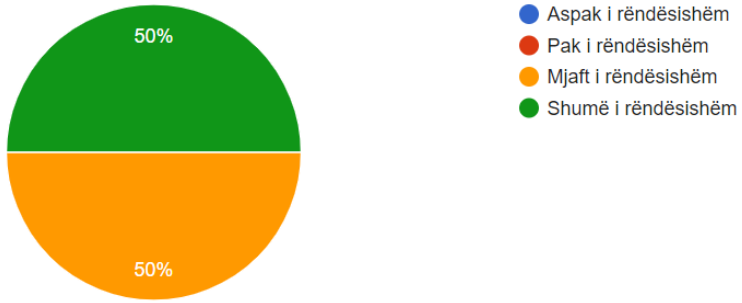

Figure 3. How important is digitalization to the business?"
Source: Author's processing

What it is describe in the Figure 3, it's that 50% of the subject in the study consider very important the digitalization in their business, and in the same time 50% of them consider important the digitalization aspect.

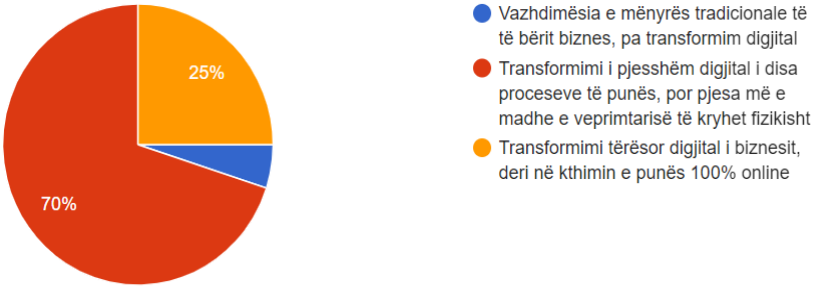

Figure 4. What is your strategy for the future of your business?
Source: Author's processing

The largest percentage 70%, in the answers of respondents is the partial digital transformation of some work processes, but the majority of activities are still carried out physically 25% affirm the importance of the complete digital transformation of the business, leading to a 100% online shift, like future strategy. Only 5% emphasize like strategy the continuity of the traditional way of doing business.-

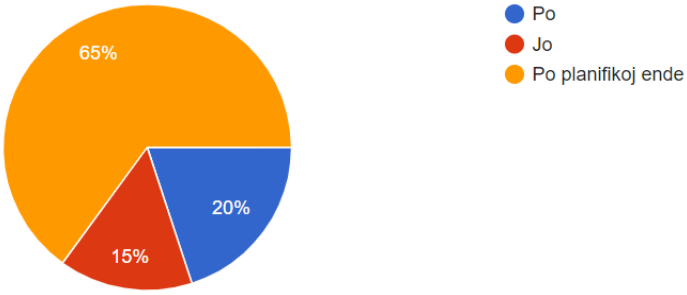

Figure 5. Have you taken any steps toward digitalizing the work process?
Source: Author's processing

Since digitization is a phenomenon that has been developing a lot lately in our country, all the participants have thought about it 20% and 65% are planning to further develop the aspects of digitization.

Figure 6. Do you believe that the digitalization of the tourism sector poses a threat to your operations as a travel agency or tour operator?

Source: Author's processing

According the graph in the Figure 6. 15% are agree. The business would never manage to transform entirely in the digital aspect.- 60% Disagree, on the contrary, the business would manage to adapt to new trends and benefit from them.- and 25% don't think that there would be a noticeable impact. –

4. Results and Discussion:

The results revealed a notable increase in the adoption of digital services across the industry. Online booking platforms, mobile applications, and virtual tours have become prevalent tools for both tourists and service providers. According the travel agencies and tour operators, tourists expressed a positive shift in their overall experience due to digital advancements. The convenience of online bookings, real-time information access, and personalized recommendations were highlighted as significant contributors to enhanced satisfaction levels. As the results of the study, service providers, on the other hand, acknowledged the efficiency gains brought about by digitalization. Improved operational processes, better resource management, and increased visibility in the online marketplace were identified as key benefits. However, challenges such as cybersecurity concerns and the need for continuous staff training were also recognized. In the other hand, the discussion section delves into the interpretation and implications of the results, providing a deeper understanding of the impact of digitalization on the tourism sector in Albania.The positive feedback from tourists indicates a growing demand for digitally facilitated services. It is evident that tourists now expect seamless digital experiences, from pre-trip planning to on-site activities. This shift necessitates a continuous commitment from the tourism industry to invest in and adapt to evolving digital trends. Also, service providers benefit significantly from the integration of digital tools. The streamlining of operations and the ability to reach a broader audience contribute to the overall growth and competitiveness of businesses within the sector. The discussion emphasizes the importance of service providers staying attuned to emerging technologies and consumer preferences. About the challenges and areas for improvement the discussion of the studies explores potential solutions and highlights the need for collaborative efforts between the public and private sectors to address these challenges effectively.

In conclusion, the study provides a comprehensive understanding of the impact of digitalization on the tourism sector in Albania. The positive outcomes and challenges identified lay the groundwork for future strategies and initiatives aimed at fostering a digitally resilient and visitor-friendly tourism industry.

5. Conclusions:

- This research highlighted the underdeveloped way in which technology is incorporated into the daily work of economic entities in the field of tourism.
- The data analysis shows that 99% of Travel Agencies and Tour Operators are endowed with practical technological devices, like PC, Scanner, Printer.
- All the subject in the study have created a digital database, example Google Sheets, that entails information about their clients, also they have the capability to extend their working hours to locations beyond their offices.
- According the results, 99% of Travel Agencies and Tour Operators use social media platforms as integral channels for marketing and communicating.
- A number of travel agencies and tour operators use an online booking system with a wide B2B database, becoming distributors of the largest travel companies, while the rest operates through contracts with foreign agencies that bring tourists to Albania.
- The majority of the bookings of tour or holiday packages by the Albanian citizens are made at the offices or through phone calls and text messages. Rarely is the entire reservation and payment made by digital means, specially 65% of Travel Agencies and Tour Operators surveyed, accept payment made possible with credit cards, which leaves 35% incapable of accepting this method of payment
- Most of the travel agencies and tour operators have access and use the government'swebsites frequently.
- 45% of the agencies affirm that the digital transformation of the business will facilitate the distribution and sale of their products and services. On the other hand, 35% of the subjects describe the digital transformation of the business will make it more efficient and profitable by reducing costs and increasing revenues.
- Through digitalization, a sufficiently advanced network of communication and information transmission has been created, so that some use chatbots for communication with customers.

6. Recommendations

- The role of the government in fostering a conducive digital environment is discussed. The study suggests that policymakers should consider creating supportive frameworks, investing in digital infrastructure, and promoting digital literacy to ensure a sustainable and inclusive digital transformation.
- Technology is always changing greatly, so agencies must be alert to changes and staff training to be in the market and to ensure a higher profit.
- In the future, travel agencies and tourist operators should use more online payments instead of cash, creating flexibility and convenience for all customers everywhere.
- Evaluate the level of training and skill development provided to employees regarding digital tools and technologies. This is crucial for ensuring that the workforce is equipped to leverage digital resources effectively.
- Studies should be developed in this sector and educational practices for tourism should be increased, as it is one of the areas that brings a lot of profits to the country's economy, family economy as well as foreign investments.
- Explore the adoption of emerging technologies such as artificial intelligence, chatbots, and virtual/augmented reality in enhancing customer experiences and streamlining operations.

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ПРОЄКТ ДЕРЖАВНОГО АРХІВУ КИЇВСЬКОЇ ОБЛАСТІ «НЕПРОСТІ ЛИСТИ» ЯК ДЖЕРЕЛО ВИВЧЕННЯ ІСТОРІЇ УКРАЇНИ В ЧАСИ ДРУГОЇ СВІТОВОЇ ВІЙНИ

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THE PROJECT OF THE STATE ARCHIVE OF THE KYIV REGION «NEPROSTI LETTERS» AS A SOURCE OF STUDYING THE HISTORY OF UKRAINE DURING WORLD WAR II

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Анотація

Стаття присвячена колекції документів Державного архіву Київської області, що містить листи остарбайтерів вивезених з Київщини в роки Другої світової війни в Німеччину. Ці листи через цензурні обмеження з боку радянської влади ніколи не були вручені адресатам і ніде не оприлюднювались. Вони лягли в основу проєкту Київського обласного архіву «НепрOSTI листи» метою якого було познайомити громадськість із маловідомими документами часів війни та персоніфікувати історію мешканців області. Було встановлено, що до реалізації проєкту архівом було залучено органи державної влади, музейні заклади, громадські організації, місцевих активістів. Оприлюднена інформація є надзвичайно важливою для вивчення історії Київщини та її населення в період фашистської окупації. Проєкт є актуальним в наші дні, коли Україна потерпає від рашистської агресії, а мешканці окупованих територій від свавілля окупантів. Представлені матеріали дають можливість провести паралель між діями фашистської Німеччини на окупованих територіях в середині XX ст.. і діями сучасних агресорів.

Abstract

The article is devoted to the collection of documents from the State Archives of the Kyiv Region, which contains letters from Ostarbeiters deported from the Kyiv region to Germany during World War II. Due to censorship restrictions on the part of the Soviet authorities, these letters were never delivered to their addressees and were never published. They formed the basis of the Kyiv Regional Archive's project "NeprOsti Letters," which aimed to familiarize the public with little-known wartime documents and to personify the history of the region's residents. It was found that the archive involved public authorities, museums, NGOs, and local activists in the project. The published information is extremely important for studying the history of the Kyiv region and its inhabitants during the Nazi occupation. The project is relevant today, when Ukraine is suffering from racist aggression and residents of the occupied territories from the arbitrariness of the occupiers. The presented materials allow us to draw a parallel between the actions of Nazi Germany in the occupied territories in the mid-twentieth century and the actions of modern aggressors.

Ключові слова: Державний архів Київської області, Друга світова війна, документи, остарбайтери, проєкт «НепрOSTI листи».

Keywords: State Archives of the Kyiv Region, World War II, documents, ostarbeiters, «Neprosti Letters» project.

Вступ. Україна зараз переживає непрості часи. Вже в який раз північний сусід посягає на її волю і державність. Тільки за XX ст. було зроблено декілька спроб загарбати її землі, знищити національну ідентичність, нав’язати чуже бачення майбутнього. Свідками цього є архівні документи. В них віддзеркалилась боротьба народу України за право йти своїм шляхом, споконвічне прагнення свободи, нелегкі долі людей, що проживали своє життя в умовах іноземної агресії. Архівні установи України містять потужний інформаційний потенціал, який, як

ніколи, є актуальним та затребуваним суспільством. Саме тому в проєкті Стратегії розвитку архівної справи на період до 2025 р. наголошується, що «архіви були, є і будуть важливим інструментом формування історичної пам'яті кожної країни, нації та людства уцілому» [1:3]. В сьогоднішній боротьбі українців історична пам'ять є основою міцності, сили духу і незламності перед обличчям ворога. Отже українські архіви мають бути включеними в процес повернення народу її історії без прикрас і викривлень. В цій історії мають існувати живі люди, які жили, боролись і страждали так, як і сучасні українці.

Основна частина. З моменту встановлення державної незалежнос ті в суспільстві поступово відбувалось усвідомлення того факту, що архіви і архівні документи є важливим інструментом формування історичної пам'яті українського народу та його національної ідентичності. На цей запит суспільства українські архівісти відповіли формуванням тисяч виставок архівних документів, створенням документних баз даних, організацією онлайн доступу до архівних ресурсів тощо. Цікавою формою оприлюднення архівних документів є архівні проєкти. Особливо якщо вони торкаються української історії часів війни і життя під окупаційними режимами. На жаль, сучасні окупанти діють методами фашистського Рейху: викрадають і катують мешканців окупованих територій, депортують їх, намагаються позбавити історичної пам'яті. Це вже було в історії України, цього не можна забувати і вибачати. Весь світ має побачити і усвідомити, що вчорашній фашизм XX ст.. повернувся до нас у вигляді сучасного рашизму в XXI ст..

Проєктна діяльність вже давно стала органічною складовою інформаційної діяльності Державного архіву Київської області (далі ДАКО). Його архівні проєкти є добре відомими за межами архівної спільноти Київщини. Ще навесні 2019 р. ДАКО започаткував масштабний історико-документальний і громадський проєкт «НепрOSTI листи», присвячений Дню пам'яті і примирення та 75-й річниці вигнання нацистських окупантів з України. Метою проєкту було вшанування пам'яті жертв Другої світової війни на Київщині та організація заходів, в результаті яких передбачалось урочисте вручення копій листів остарбайтерів сьогоднішнім адресатам. Невдовзі співорганізаторами і партнерами проєкту стали: Київська обласна державна адміністрація, Центральний державний архів аудіовізуальних та електронних документів, Всеукраїнський проєкт «Пам'ять нації», архівні відділи районних державних адміністрацій та міських рад Київської області, Національний історико-краєзнавчий заповідник «Переяслав», Національний музей-заповідник «Битва за Київ у 1943 році», КЗ КОР «Білоцерківський краєзнавчий музей», Макарівський районний історико-краєзнавчий музей тощо. Проєкт «НепрOSTі листи» об'єднав архівістів, музейників, істориків-краєзнавців Київщини у копіткій праці з розшуку та повернення адресатам листів остарбайтерів, що не були доставлені восени 1943-го і нині знаходяться на зберіганні у ДАКО.

Відлік реалізації проєкту можна розпочати з настановної наради робочої групи що відбулась в ДАКО 26 березня 2019р. Її учасники розпочали роботу над розділом проєкту «НепрOSTI листи-пошук адресатів». Під час зустрічі представники архівних відділів районних державних адміністрацій і міських рад, а також освітніх, бібліотечних та музейних установ Київщини отримали від директора державного архіву Софії Каменєвої настановну інформацію. Пані Софія наголосила на важливому історико-культурному значені проєкту, його меті, етапах реалізації та ключових заходах. Члени робочої групи взяли участь у практичному семінарі з питань методики роботи з особистими документами та проведення пошуку осіб, яким будуть вручатися листи їхніх рідних, що перебували у 1942–1945 роках на примусових роботах у Німеччині. Координатор проєкту, начальник відділу використання інформації документів ДАКО Наталія Бацак, запропонувала до обговорення робочою групою ряд питань щодо практичної реалізації колективного пошуку інформації в архівних документах та складання на її основі бази даних прізвищ остарбайтерів по населених пунктах Київської області. Другу частину зустрічі учасники проєкту присвятили практичній роботі з документами. Був розпочатий пошук інформації в листуванні остарбайтерів з Білої Церкви, Борисполя, Броварського, Вишгородського, Іванківського, Обухівського та Переяслав-Хмельницького районів. 7 травня 2019 р. в приміщенні виставкового залу ДАКО було відкрито виставку документів із фондів архіву, де презентувались документи періоду німецької окупації Київщини, копії листів остарбайтерів, що вже 75 років знаходились у фондах архівної установи, але не були оприлюднені належним чином. Відкриття виставки мало широкий громадський резонанс. Під час презентації виставки перші копії 25 листів остарбайтерів з Київщини було вручено їх нащадкам [2]. Проєкт «НепрOSTі листи» в 2919 р. було реалізовано у Бориспільському, Броварському, Іванківському, Макарівському та Переяслав-Хмельницькому районах Київської області. В контексті реалізації проєкту архівом було організовано «живі» заходи із залученням студентської та учнівської молоді: студентами та викладачами історико-філософського факультету Коледжу Київського університету імені Бориса Грінченка, студентами-документознавцями та викладачами кафедри історії та документознавства НАУ; зустрічі із вчителями та учнями ряду шкіл Київської області тошо. В травні 2020р. архів презентував онлайн виставку «Остарбайтери Київщини: документи».

Зазвичай, вручення копій листів, відбувалось за сприяння і участі голів райдержадміністрацій, Державної архівної служби України, рад ветеранів, ЗМІ, широкої громадськості і перетворювалось на зворушливий «неформальний» захід, де було місце суму і сльозам Так, 26.06.2019 р. в м. Переяслав-Хмельницькому під час вручення копій 13 листів жителям району була присутня 93 - літня жителька затопленого села Андруші, якій архівісти вручили

копію її власного листа, написаного багато десятиліть тому.

До популяризації та висвітлення ходу реалізації проєкту архівна спільнота Київщини активно долучала ЗМІ. Місцева телекомпанія Миронівського району разом із місцевими архівістами організувала зйомки телесюжету про архівно-музейний проєкт «НепрOSTі листи» із записом інтерв'ю з колишнім остарбайтером, жителькою с. Тарасівка Миронівського району та онукою колишніх остарбайтерів з с. Пустовіти. Подібний сюжет був також записаний за участі працівників архівного відділу Бориспільської міської ради. 13 архівних відділів та секторів міських рад та райдержадміністрацій включили матеріали проєкту до фотодокументальних виставок до Дня Пам'яті і примирення 2019 р. В місцевій пресі було оприлюднено 7 публікацій з приводу проєктних заходів[3:8].

Реалізація проєкту не була зупинена навіть з початком повномасштабного російського вторгнення в Україну і тимчасовою окупацією декількох районів Київщини. Як тільки українські території було звільнено робота з листами репатріантів продовжилась, щоправда набула дещо нових форм і учасників. До реалізації проєкту в 2022 р. долучились міжнародні організації, зокрема корпорація Family Search International, яка надала обладнання для створення цифрових копій фільтраційних справ, які завантажуються до відповідних прізвищ репатріантів. За рахунок співпраці з корпорацією було створено 2 700 нових цифрових копій фільтраційних справ і до пошукової бази внесено майже 12000 нових прізвищ колишніх остарбайтерів Київщини. Загалом у пошуковій базі наразі вже міститься 105 552 прізвища та 17000 справ репатріантів, що повернулись на Київщину після Другої світової війни з примусових робіт в Німеччині [4]. Оцифровуються і самі листи українських остарбайтерів. Створена цифрова база дає надію на продовження проєкту «НепрOSTІ листи» а також на те, що колись зустрінуться більшість листів і їх адресатів. Можливо, це будуть їх нащадки, але гірка пам'ять про страждання українців в середині XX століття від рук фашистів набуде подальшого розголосу.

Нині проєкт ще не завершено, ведеться пошукова робота, що координується ДАКО. Щоквартальні та річні підсумки реалізації проєкту заслуховуються на засіданнях колегії ДАКО. Сподіваємось, що його остаточна реалізація принесе багато відкриттів, і про цей надзвичайно цікавий комплекс архівних документів часів Другої світової війни дізнається якомога більше українців.

Висновки. Отже, архівнй проєкт ДАКО «НепрOSTІ листи» є важливою і актуальною презентацією української історії часів Другої світової війни. Він показує історію через людський вимір, що не мав належного вивчення за радянських часів і в перші роки української незалежності.

Сьогодні перед архівом стоїть нове завдання і новий проєкт-ініціативне документування подій і фактів війни на Київщині, в тому числі і акцій направлених проти мирного населення що побувало під окупацією. Цей проєкт під назвою «Архів війни: зібрати та зберегти» перегукується із проєктом «НепрOSTІ листи» часів Другої світової війни, коли цивільне населення України на собі відчуло жахи окупаційного режиму. Новий документальний фонд архіву «Колекція російсько-української війни на Київщині» має зберегти для нащадків пам'ять про нову сторінку боротьби українського народу за свою незалежність, звіряче обличчя окупантів XXI ст.. Можливо ці документи фігуруватимуть на новому судовому процесі цивілізованого світу над рашизмом.

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